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ORIGINAL ARTICLES.

STUDIES ON THE LESIONS PRODUCED BY THE ACTION OF CERTAIN POISONS ON THE NERVE-CELL.

[From the Anatomical Laboratory of the Johns Hopkins University.]

Part II.—Experimental Lesions Produced by the Action of Dog's Serum on the Cortical Nerve-cell of the Rabbit's Brain.

(PRELIMINARY PAPER.)

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THE interest that has recently been taken in the action of a number of soluble bacterial poisons produced in the course of certain infectious diseases, and capable of inducing various epiphenomena from their effect upon the nervous system, is well attested by numerous articles from the pens of authors in the four principal languages of the civilized world. The endeavor of the majority of these workers has been to discover in the corpus of the nerve-cell certain definite changes by means of selective stains, rather than to take up the several members of the neuron and consider them separately, and, indeed, this has only recently become possible.

While it is possibly stretching a point to consider blood-serum in the light of a bacterial poison, its action upon the tissues is not dissimilar, as may be seen from the results of the examination of other organs than the cerebrum from rabbits dying of chronic serum-poisoning, and it is highly probable that we shall eventually find in every person dying after the long-continued action of soluble poisons, whether bacterial or chemic, a class of lesions of the neuron similar to those described in this communication.

In the pathologic material from the autopsy-table we are sadly hampered by a multitude of post-mortem and other changes, which, though of great moment, are imperfectly known. Therefore, experimental material, under full control from the moment the inoculation is made, through the various stages of the experiment down to fixation and the staining and mounting of the sections, is of the utmost value in establishing a precedent for a similar class of lesions in the human being, especially as there are no wide anatomic differences between the nerve-cell of the animals used and those of man.

The material for the purposes of the study is at the present time small in amount, but as it is for the moment impossible to add to it, and as the lesions in all the sections have been very constant, and of a well-defined though new type, I have concluded to utilize what I have on hand, and add to the results at a later date. I shall, therefore, confine myself to a description of the histologic changes found, without indulging in speculative conclusions, an intention for which apology is hardly needed.

It is to my mind proved by the destructive action of poisons on the nerve-cell of the cortex that it only requires the long-continued action of almost any soluble toxin to cause destructive effects on the neuron, and that these do not call for the presence of a micro-organism. This principle may be more clearly demonstrated in subsequent papers, and it will probably eventually be shown that poisons that are supposed to be limited in their action are probably universal nerve-poisons, and that their continued action results in an extensive degradation of the entire nervous system, if only a sufficient length of time be allowed them.

In the winter of 1893, Dr. Simon Flexner, of the Pathological Laboratory of John Hopkins Hospital, began a series of experiments upon the action upon rabbits of blood-serum obtained from man and the dog. These researches have been continued, although an outline of the pathologic changes found after the inoculations, in connection with a series of other studies, has already been published.[1]

Briefly, Flexner found that injections of serum of 1.5 per cent. of the bodily weight of the animal experimented upon were usually fatal, death occurring either immediately or after the lapse of ten or twelve hours. Quantities equal to 1 per cent. of the bodily weight caused profound disturbances, including hemoglobinuria and albuminuria, less commonly anuria, and in a few instances immediate death. When death followed at once it was usual to find thrombi in the right side of the heart, which now and then extended into the pulmonary artery and its branches. Cases in which the death of the animal was delayed for a time were of especial interest, as they showed well-marked lesions resembling in many ways the changes described in connection with the toxalbumins of diphtheria, ricin, and abrin.

The organs studied were the spleen, liver, kid-

[1] "The Pathologic Changes Caused by Certain So-called Toxalbumins." THE MEDICAL NEWS, Aug. 4, 1894, p. 116.

neys, and lymph-glands. In the acute cases the spleen showed a tolerably rich fragmentation of nuclei situated especially in the Malpighian bodies; the liver, certain foci of cellular necrosis; while the renal epithelium was degenerated and many casts blocked the kidney-tubules. Very extensive lesions were found in one animal that died on the thirteenth day. The microscopic appearances were those of chronic interstitial processes in the liver and kidney. In the latter organ the tubules were in places atrophied and surrounded by a new growth of connective tissue; in other places the tubules were dilated and their epithelial lining degenerated. In the liver the chronic changes were exceedingly well marked, and were an accurate reproduction of cirrhosis in the human being. Areas of newly formed or forming connective tissue proceeded from the portal spaces and from the capsule; newly formed bile-ducts were numerous, but what was of especial moment was the association with these changes of another process, viz., acute degenerative changes in the liver-substance, which were often distinctly the starting-places of the sclerosis. In the spleen masses of fibrous tissue were found. These changes show that the damage the serum is capable of doing is not limited to the corpuscular elements of the blood, for the tissue-cells also are not indifferent to its action.

From a later series of experiments than those just referred to, Dr. Flexner very kindly placed at my disposal the cerebra of several of the rabbits, in order to enable me to determine if the nerve-cells suffered from the action of the serum in a manner equivalent to those of the viscera mentioned. Unfortunately for our closer knowledge of the cerebral cells, these elements do not show mitotic figures, nuclear fragmentation, and coagulation-necrosis in the same manner as the liver-cells, but with our best stains, whether chemic combinations with the cellular substance or simple dyes, they are eminently stubborn to microscopic analysis; and from the reaction of the protoplasm to the dyes we can demonstrate in cells we perforce know must be diseased only indefinite alterations in the amount of absorption of the dye by the protoplasm, especially of the chromophilic particles, and most uncommonly any definite changes in the nucleus or nucleolus. These difficulties in obtaining accurate results from minor changes in the nerve-cell probably arise from the circumstance that the nerve-cells are completed elements, incapable of regeneration, and only show alterations of a pronouncedly degenerative type.

The material for this study has to this time been the brains of three rabbits from parts of two series of serum experiments, and, as the lesions of the cortical cells were determined, they were constant and identical in all the animals, though varying in intensity, seemingly according to the severity of the poisoning, as rabbit No. 2, first series *a*, which died from the result of an injection and not from the long-continued poisoning the others underwent, exhibited vastly larger numbers of normal cells than its companions in the investigation. It will be noticed in the table that this rabbit only lost about two-hundred grams in weight, and, accordingly, was not so greatly emaciated as the others. It is, at present, impossible to determine exactly what part the denutrition of the tissues plays in the production of the lesions of the nerve-cell, but I can hardly doubt that it is very secondary to the direct influence of the poison upon the cell, for in human alcoholics that show no emaciation the same kind of lesions are found, varying somewhat in intensity.

A synopsis of the histories of the rabbits comprising the basis of this study is given in the following table:

SERUM RABBIT SERIES.

Number.	Age.	Weight at beginning of experiment.	Begun inoculations.	Quantity injected.	Frequency of inoculation.	Date of death.	Weight at death.	Clinical cause of death.	Gross anatomic lesions.	Remarks.
1 Series 2, *b*.	Adult.	1700 g.	Nov. 22 1894	6 c.cm. increased to 18 c.cm.	Intervals of 2 w'ks.	Apr. 8 1895	1900 g.	Exhaustion.	Great emaciation; no visible lesions.	There were no well-marked meningeal changes in any of the rabbits.
2 Series 1, *a*.	Adult.	1700 g.	Nov. 6 1894	6 c.cm. increased to 18 c.cm.	Intervals of 2 w'ks.	May 5 1895	1500 g.	Overdose of serum.	Thrombi in heart and brain.	Injections of 12 c.cm. were fatal in control-rabbits.
3 Series 1, *b*.	Adult.	1700 g.	Nov. 6 1894	6 c.cm. increased to 18 c.cm.	Intervals of 2 w'ks.	May 31 1895	1300 g.	Exhaustion.	Great emaciation; no gross lesions.	Rabbit No. 2 died suddenly after an injection of serum.

METHODS OF PREPARATION AND STAINING.

The methods pursued in the preparation of the cerebral tissues for this investigation were similar to those made use of in Part I,[1] of these studies, namely, fixing the tissues in alcohol and in Müller's fluid, and after treatment with various anilins, hematoxylin, and silver-staining, according to the silver phospho-molybdate formula, as already given.

[1] Part I, "Experimental Lesions Produced by the Action of Absolute Ethyl-Alcohol on the Nerve-cells of the Rabbit's Brain," will appear in the autumn number of Brain.

The control-preparations were obtained from the cerebra of two young but full-grown rabbits, treated exactly according to the same formulæ for the fixing and staining, kept for the same length of time in the hardening media, and stained exactly by the same procedure as the serum-brains, often running the two together in the same jars.

As mentioned in the first section of these studies, there are upon the dendrons of the nerve-cells of the cortex a minimal number of thickenings or varicosities. The majority of these occur at the forkings of the dendritic branches, and rarely indeed is one to be found in the course of any of the finer branches in the normal brain. In the course of the axis-cylinder there are also knots of somewhat greater frequency, which begin at a variable interval from the cellular body, and continue through the entire intra-cortical course of the axon. Occasional varicosities of the dendron must, therefore, be held to be normal, the same holding good for the axon, although in the latter they are present in greater frequency. Since Coella, Greppin, Andriezen, and a few others have found in human brains, principally those of paralytic dements, an increased number of swellings upon the dendrons, the subject of these varicosities has attracted some little attention. Flatau[1] has quite recently discussed them at some length, and has arrived at the conclusion that they are natural.

It is quite possible to imagine that normal brains have a varying number of varicosities upon their dendrons, but when they increase vastly in size and occupy the whole dendron, they must be held to be abnormal, especially when they present a size that is incompatible with anything in the normal control-preparations; and the entire cell, with the exception of the axon, frequently shows evident signs of the presence of a destructive process. Not only are these abnormal swellings of great frequency on the finer branches and along the stems of the pyramidal nerve-cells, but it may readily be demonstrated that the very varicosities normally present, particularly the enlargements at the branchings of the dendrons, take on this alterative process, and in themselves became tumefied. Furthermore, we have one certain sign of dendritic degeneration in the pyramidal and some other nerve-cells that seems to have entirely escaped the attention, not only of the criticisers of the value of the probable degeneration, but also of its exponents. I refer to the disappearance of the gemmules or lateral buds upon the branches of the dendrites, which takes place whenever the tumefactive process is at all advanced, or even occurs coequally with this.

I have elsewhere written more fully of the gemmule and its significance histologically, and in certain forms of dementia, and it suffices now to give a short anatomic description of one very interesting part of certain of the most important of the nerve-cells, which for some unexplained reason, possibly from defective staining, has hitherto received but little attention. The gemmule, in its most developed state, is found only on the dendrites of two classes of nerve-cells, the pyramidal or psychic cells of the cerebral cortex, and the Purkinje cells of the cerebellar cortex. Histologic differences in the appearance of the gemmules are very apparent in these two varieties of cells. With the pyramidal bodies they present very much the appearance of a thin pin with a rounded head, having its sharpened point stuck into the protoplasmic substance along the edges of the dendrons, both the ascending and basal of the cells. They are arranged with considerable regularity along the thicker protoplasmic branches, and at a rectangle with the stem of the dendrite.

On the finer dendrites the intervals between the gemmules are slightly increased, and while preserving the same form as on the thicker branches they are slightly longer, and have less of the rectangular disposition. On the branches of the Purkinje cell the gemmules are very numerous and much more closely set together than on those of the pyramidal cell, and they give to the neuron a furry appearance. Besides these inherent characteristics, they begin by a broad base, do not increase in size as they extend outward, and terminate not in a rounded knob, but in a flattened ending that is no larger than the proximal portion of the stem. Here and there between the others single ones are found, similar in appearance to those of the cortical cells.

The function of the gemmule probably is to receive nerve-impulses from the endings of the numerous terminal nerve-fibers that seem almost to touch them, and to carry these impressions to the dendrite, and by its medium on to the cell-body. Differences in the function of the gemmule of the pyramidal and Purkinje cell are probable.

HISTOLOGY OF THE ALCOHOL-HARDENED SERUM-SPECIMENS.

The staining of the sections for this portion of the study was by Nissl's methylene-blue and magenta, and hematoxylin-eosin. The only noticeable difference between the several brains was that in No. 2 the perivascular spaces contained a considerable number of polynuclear leukocytes, while in the other specimens these corpuscular bodies were absent.

The larger and medium-sized arteries have absolutely no sign of alteration in their several coats. The intermediary vessels are not at all prominent; their sheaths are normal; and the perivascular

[1] Archiv für Mikroskop. Anatomine, May, 1895.

spaces, while distinct, are not dilated, and contain no foci of round-cell aggregations and no hematoidin débris. The capillaries and veins are normal. The endothelium of the vessels shows no trace of swelling or other abnormality.

The staining of the nerve-elements by the Nissl methods was made as intense as possible, and the decoloration not allowed to proceed quite to the usual point, in order to leave the protoplasmic processes stained to their fullest extent. The nuclei of the nerve-cells do not seem to be shrunken or irregular in contour. Few of them are of other than the mono-nucleolar variety. This nucleolus is smooth, lies toward the center of the nuclear ring, and shows no alteration in its capability for the absorption of the anilin.

Changes in the protoplasm of the corpora of the cells are somewhat indefinite. The protoplasm takes the anilin stain well, but the chromophilic particles are not well defined, and the intervening spaces between them seem to be occupied with more of the fine granules than are present in the control-slides. No stress can be placed on these indefinite changes.

A very few of the pyramidal cells contain vacuoles, but not even as many as three in a section. Seldom is there any appreciable shrinkage in the protoplasmic body ascertainable. The protoplasmic arms of the cells are very finely granular. In some of them small knots are to be seen, the swelling being recognizable from the absorption of a greater quantity of the dye than is present in the portions more distant from and more proximal to the cell-body. In the swelling the fine granules become less distinct than elsewhere.

In the cerebellum there is nothing noticeable in the cells of the granular and molecular layers. A few of the Purkinje cells are vacuolated.

HISTOLOGY OF THE MÜLLER'S FLUID-HARDENED SPECIMENS.

The staining of these sections was solely by the silver phospho-molybdate method. Between Brains 1 and 3 there were no microscopic differences of moment. Brain No. 2 showed a slighter degree of degenerative changes in the neurons than the others, and was especially interesting from the fact that the degenerated could always be found intermingled with approximately normal cells, affording an opportunity for an accurate comparison between the different elements. This brain was also remarkable for the beautiful staining of the nerve-elements of all the layers, which were exhibited in as perfect a manner as can ever be obtained in silver-preparations, and the sections were not disfigured by the presence of precipitate, even the external margins being free.

The lesions found in all the cerebra were closely allied to those found in the alcoholic brains that formed the basis of the first study. Cells of all layers were involved in the destructive process, the pyramidal of all varieties in the first order, then the deeper-lying elements, finally those of the extreme outer edge of the second layer and the elements of the molecular lamina.

A view of a section under low enlargement shows that the primary processes of many of the pyramidal cells no longer reach into the outer portions of the molecular lamina. Their finer dendritic branches have disappeared, while the thicker ones are filled with a multitude of coarser and finer knots, scattered with some regularity along the line of the stem. On the other hand, the thick intra-capsular portions of the dendrites have not become diseased in a similar manner, but apparently retain their integrity in so far that they are not altered in appearance by coarser changes, and seldom does the body of the cell present aught but its even, rounded contour. The basal processes are often likewise shortened, and show the knotty growths upon them like their ascending fellows.

Not every cell presents a similar degree of alteration, and according to the degree of involvement they may be divided into three classes: Cells in which the process is beginning; those in which it is moderately advanced; those in which the dendrons are very much degenerated. The normal cells in Brains 1 and 3 were comparatively infrequent; in No. 2, on the contrary, more that two-thirds of the stained cells were normal.

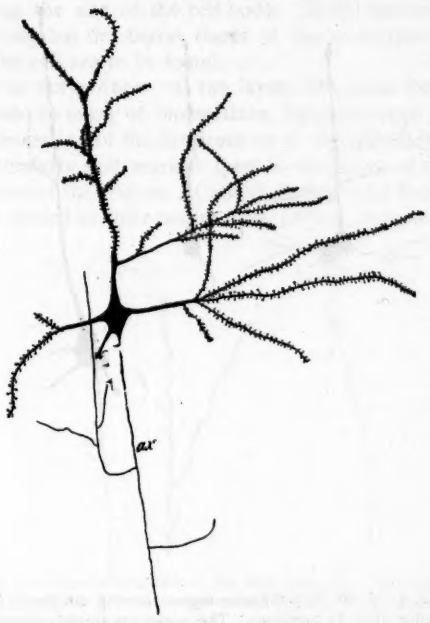
As the degenerative process is of similar character among all the classes of cells, we have taken the most prominent type, the pyramidal cells, as the criterion of the whole, as they are very much easier to study than the other, and have a definite size and anatomic characteristics, as well as stain constantly.

CLASS A, CELLS SLIGHTLY INVOLVED IN THE ALTERATION.

High up in the molecular layer we find upon the finest branches of the dendrons of the pyramidal cells, especially those of the long apical-process variety, a few tumefactions of either rounded or elongated form in the course of the stem. These tumefactions are deeply stained by the silver-salt, are smooth, and have few or no gemmules attached to their sides, or, when these are still present, there are perceptible differences in the tingeing with the silver-salt that indicate an alteration in their structure. Both nearer the cellular body and distally from the swelling, the dendrite appears to be perfectly normal, the staining is good, and the pin-like lateral buds are numerous. In these neurons the

coarser branches and the corpus of the cell are undisturbed by any alteration apparent to the micro-

FIG. 1.



Pyramidal cell from the mid-portion of the second cellular layer of the rabbit's brain, showing commencing tumefactions of the protoplasm of the finest apical dendrites, and denudation of the gemules at the points of swelling. At the uppermost forkings of the ascending dendron a normal enlargement of the protoplasm is seen, which is covered with gemules. Ax., axon.

scopic examination, and, indeed, the slight swellings on the finest twigs would occasion but slight comment were no other cells more deeply involved.

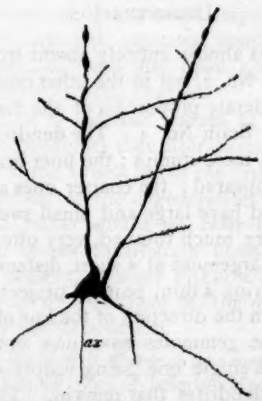
CLASS B, CELLS MODERATELY INVOLVED BY THE DEGENERATION.

This type is the most numerous of all. The tumefactions before present only on the finest dendritic branches now extend throughout the entire path of the stems of the apical and basal processes, reaching up or down to their intra-capsular portion, and many of the finest branches are no longer stained, and are apparently totally degenerated, having been partially or totally removed. The number of the swelling varies greatly in the different involved cells. Usually the dendrons have a large number of small thickenings along their course, and present a true moniliform appearance. Less commonly there are only a few of larger size, but the result to the nerve-process is the same. These large-sized swellings are peculiarly frequent at the forkings of the branches of the apical dendrons, where there is normally a thickening of the protoplasm. Rarely one meets with dendrons in which the smaller swellings are so numerous that they are coalesced, and only are noticeably different from the normal dendron by the irregularity in their contour and the loss of the lateral buds. In all the varieties there is an absolute loss of the gemmules on the dendritic processes, which eventually proceeds to a complete stripping of the dendron of all its fine rectangular pin-like processes. This denudation of the gemmule varies considerably on the different dendrons according to the number and advancement of the swellings. When the stem has only a few tumefactions the intervening spaces usually retain some of the buds, but when the swellings are numerous or very large they progressively disappear, until in a very large number of instances not only the finest branches are stripped of them, but the thicker portions are equally bare.

Following the swelling and loss of the lateral buds comes a contraction of the protoplasm of the dendritic twigs, especially that portion not involved in the swelling, though these also eventually atrophy. In the spaces between the swellings, as the process advances, the diameter of the branch grows less and less until it is reduced to a mere knotted thread. Then comes a time when there is a breaking up of the continuity of the twig. The finest branches fall off from the thicker stems, and are finally absorbed, the neuron now being reduced to the corpus of the cell, with the stumpy tumefied remains of the thicker dendrons attached to it.

I wish particularly to draw attention to the loss of the finest branches of the dendrites within the

FIG. 2.



A cell of different form from the same region of the cortex, showing an increased number of swellings and greater loss of gemmules.

limits of the molecular layer, a region of the utmost importance in the physiologic economy of the cortex. Here the branches of the dendrons, by means of their gemmules, come into contiguity with the

terminations of the nerve-fibers and end-apparatus of all descriptions belonging to the several classes of nerve-fibers, tending thitherward from the interior regions of the cortex—fibers from the cord and opposite hemisphere, fibers from the fusiform and other cells of the lowermost layers of cortical cells, collaterals from the pyramidal cells, also to some extent from the intermediary cells. Here all meet in close relation with the terminal branches of the pyramidal, and in the rabbit the bicornuate cells, and the nerve-impressions are carried through the medium of the bulbous tip of the gemmule and its stem to the protoplasm of the branch, and through this to the body of the cell.

It may be readily seen that, according to this arrangement of the fibers, no matter how small the swelling of the dendron and loss of the gemmules may be, there is an instant disruption of the close connections between dendron and nerve end-apparatus, and consequently imperfect carriage of nerve-impulses from neuron to neuron; and should the destruction proceed to any considerable extent, and involve a moderate number of the protoplasmic extensions of the nerve-cells, that a serious disturbance of the mental and motor functions of the cortex will result, ending eventually in partial or complete annulling of all the mental faculties of the animal.

None of the bodies of the cells of Class B shows any noticeable alteration in structural arrangement, the destructive process having apparently to advance to a greater degree than is found with the moderate degeneration of the dendrites.

CLASS C, CELLS EXTENSIVELY INVOLVED IN THE DEGENERATION.

This class is almost entirely absent from the cortex of Brain No. 2, but in the other cerebra it constitutes a moderate proportion of the diseased cells, especially in Brain No. 3. The dendrons are now shortened to mere stumps; the finer branches have entirely disappeared; the coarser ones are irregular in outline and have large and small swellings upon them, and are much thinned, very often terminating in an enlargement at a short distance from the cell-body, having a thin, pointed projection extending out of it in the direction of the line of the former process. The gemmules have now entirely disappeared, not a single one being visible on the portions of the dendrites that remain. The cell-body presents under these conditions two entirely different appearances, even when the dendrites are disintegrated equally. In the first one the cell-body, where the processes have almost disappeared, retains its smooth and rounded form; seldom, indeed, is it roughened, and to all appearances the condition is one of health. In the other class the protoplasmic extensions have the same general aspect, but now the corpus is distinctly involved in

FIG. 3. FIG. 4. FIG. 5.

Fig. 3.—A cell from the same region, showing atrophy and destruction of all the dendrons. The gemmules are only present at one point on the ascending process, and the cell-body is considerably eroded.

Fig. 4.—Small pyramidal cell, showing complete loss of the protoplasmic branches and gemmules, with roughening and shrinkage of the cell-body.

Fig. 5.—A long pyramidal cell from the lowermost portion of the second cellular layer, showing the swellings and shortening of the ascending process, loss of the gemmules, and great erosion of the cell-body.

Zeiss, ocular 4, objective E.

FIG. 6.

Micro-photograph of a stout ascending process of a large normal pyramidal cell, showing the arrangement of the lateral buds. A number of finer dendrons are included in the photograph. The fine granular lines indicate dendrons and vessels that were not fully in the focus of the camera.

the destructive metamorphosis. The edges of the cell are roughened and irregularly eroded; deep

excavations proceed from the periphery toward the central regions of the body; and, in exceptional and very advanced instances, nothing but a mass of detritus, blackened by the silver-salt, is seen occupying the site of the cell-body. In the last event nothing but the barest traces of the prolongations of the cell are to be found.

The nerve-fibers of the layers are quite freely stained in many of our sections, but even when the degeneration of the dendrons or of the cell-body is particularly well marked there is no lesion of this portion of the neuron. Cells that are greatly frayed and eroded in their bodies have perfect neuraxons,

FIG. 7. FIG. 8.

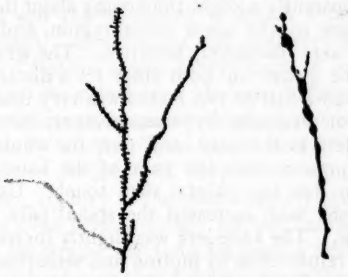


Fig. 7.—Micro-photograph of the finer portion of the ascending process of a normal long-stemmed pyramidal cell, showing the arrangement of the gemmules.

Fig. 8.—Ascending process of a pyramidal cell from a serum-brain from the same level as Fig. 7. The tumefactions and loss of the gemmules are very distinctly shown.

FIG. 9.

Bifurcation of the long process of a pyramidal cell from a serum-brain, showing a swelling of the normal enlargement at the forking, loss of the gemmules over it, and large knots in the course of the finer branches. Enlargement about 550 diameters.

and these may be traced far downward into the white medullary layers. Cells that are apparently almost totally destroyed are too few in number to allow of any accurate knowledge of their axon. The collaterals of the axis-cylinders of the pyramidal cells may be followed to their bulbous free extremities; nor do fibers coming from more distant regions and passing upward, to terminate in the molecular lamina, show anything but a perfectly natural condition. There is no increase of varicosity, no breaks in the staining of the nerve-thread, no difference in the appearance of the terminal apparatus.

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CORTEX OF THE CEREBELLUM.

The changes in the nerve-bodies resemble those in the cerebrum, but are less intense. The twigs of the Purkinje cells are often bared of their protoplasmic fur, have an occasional swelling, but are not highly degenerated. Normal Purkinje cells preponderate over abnormal ones. The free extremities of the dendrons show the alterations to a greater extent than the ones closer to the corpus of the cell, as if the swelling were just beginning. The neuraxons of these bodies are distinct and perfect. The *Korbzellen* stain infrequently, and nothing definite can be said of them. The Golgi cells are well shown, but alterations in them are slight.

Very numerous axons from the *Korbzellen*, Golgi and recurrent branches of the Purkinje cells are well stained in the molecular layer, but show nothing abnormal. Some beautiful specimens of the arborescent endings of the fibers intermingling and terminating among the branches of the Purkinje cells were found, but they also were perfectly normal, to all indications. The neurogliar structures, both in cerebrum and cerebellum, stained in numbers neither above nor below the control, and show no structural changes in their protoplasm deviating from the normal preparations. The degeneration of the nerve-cells is, therefore, probably a simple non-inflammatory process, unaccompanied by any proliferation of the supporting elements.

While the small number of the pathologic serum-brains does not allow us to speak with entire positiveness of the lesions of the cortical cells, yet from their constancy in all our preparations it is more than probable that we have found a new class of degenerative changes of the nerve-cell that will ultimately prove of the greatest importance in a long series of irritative abnormal conditions in the human subject, and will also open up a new field for the student of mental changes.

The absence of vascular lesions of importance precludes the possibility that alterations of nutrition from disease of the vessels are of the first importance in the production of the degeneration of the dendron. Much rather would we refer them to the direct action of the toxalbumin upon the cellular protoplasm, causing, in some unknown manner, at first swelling of the substance of the dendron, and later atrophy and destruction.

The Death of Dr. J. W. H. Walker.—At a meeting of members of the class of 1893 of Jefferson Medical College, on Thursday, August 22, 1895, resolutions were adopted, deploring the untimely death of their classmate, Dr. J. W. H. Walker, and expressing sympathy for his family in their bereavement.

Prof. Hoppe-Seyler, the distinguished physiologic chemist and Professor of Physiology and Pathology in the University of Strasburg, died suddenly in an apoplectic seizure on August 12th.

CLINICAL LESSONS.

Hysterical Contractures.

BY S. WEIR MITCHELL, M.D.,
OF PHILADELPHIA;
PHYSICIAN TO THE ORTHOPEDIC HOSPITAL AND INFIRMARY FOR NERVOUS DISEASES.

(Concluded from page 206.)

I DISMISSED last week a case of contracture in which the legs were in extension. I read you the notes as an interesting contrast to the flexor-spasms just described. I like also to speak of this case because it illustrates one very rational way of dealing with a partially developed hysteria, for really, despite a long history, it was undeveloped. A year or so more at home would have given us another bed-case.

Annie P., an unmarried white girl, seventeen years of age, was sent to me for treatment, and was admitted to the Infirmary, November 3, 1894. The family history was negative. She had four brothers and five sisters who were living and well. The patient was a small child at birth, but always enjoyed good health. She had the ordinary diseases of childhood, and a slight attack of typhoid fever, and attacks of influenza in 1890, 1891, and May, 1892. After partial recovery from the last attack she suddenly began to suffer from pain in the right heel and the arch of the foot, with a feeling as of a "large stone in the shoe." Hot water gave relief. The pain returned, and was now better and again worse. The heel and indeed the whole foot, and later the calf and the outer side of the thigh, became very sensitive to touch, and were also the seat of much spontaneous pain. Later, pain appeared in the left heel and spread similarly.

About one year after the first attack the girl was suddenly seized with acute and severe pain in the sacrum, which crawled slowly up the whole spine. Motion of the arms and legs, she said, made the pain worse. She now took to her bed (May, 1893). In one day, soon afterward, she became rigid, with the arms spread out laterally, the head retracted, and the legs extended. Pain was then severe in all the extremities, but not alone in the shortened muscles. It gradually grew less toward evening, but the rigidity continued. The patient was never unconscious. During the summer of 1893 she recovered sufficiently to walk a little, but she still had great back-pain and frequent relapses.

In October, 1893, after walking "too far," she was given a hot bath. When taken out she fainted, and had "heart-failure" and frequent trouble with her heart afterward. She was almost constantly on a bed or sofa from that time, and had occasional attacks of asthma during the year before coming under observation. Menstruation, regular and painless before the present trouble, was still fairly regular, but the flow was very dark and offensive, though quite free. Otherwise there were no signs of disease of the genito-urinary organs. The appetite was fair, considering the very long confinement. Digestion was good. The bowels were costive.

Examination showed a slightly built, anemic looking girl, weighing 83 pounds. She said that at twelve years of age she weighed 97 pounds. She was very much emaciated, especially in the legs. The growth of hair was unusual and excessive for her age and sex, all over the body as well as on the head. The skin was in good order, and the nails smooth and well formed. All touch anywhere on the legs and feet was painful, especially on the inner aspect. This sensitiveness varied from time to time. A slight touch was painful; pressure excessively so. The nerve-trunks seemed no more tender than the muscles. Two points were nowhere distinguished as one on the feet at less than an inch, and at a slightly less distance on the legs. The temperature-sense was normal. The abdomen was not sensitive, and there were no hysterogenic zones in the ovarian regions.

The girl was without pain in the arms. There was apparently a slight thickening about the spinous processes in the lower dorsal region, and the processes were excessively sensitive. The whole spine and the gutter on both sides for a distance of an inch-and-a-half or two inches was very tender, with areas of exquisite hypersensitiveness between the shoulders, at the waist, and over the whole sacrum. Firm pressure with the palm of the hand over the sacrum was less painful than touch. Use of the arms, she said, increased the spinal pain and tenderness. The knee-jerk was slightly increased, and easily reinforcible by motion and sensation. There was no clonus. Elsewhere the muscular and all other reflexes were normal. A presystolic murmur was heard at the base of the heart and along the left side of the sternum, and faintly in the axilla and at the apex. The pulse, which was soft and wanting in fulness and force, varied from 100 to 120. Respiration varied from 30 to 50.

It is rare to see as great sensitiveness to touch as Miss P. exhibited, and still more rare to find the muscular tissues sensitive. As to contracture, the condition found was rare and curious. The extensors and flexors all felt firm, but the result was a stiffening of both legs in extension. The feet were less drawn. The arms were not in a state of contracture. All efforts to flex and, after flexion, to extend the legs met with that continuous yielding resistance common in spastic states, and to which long ago I gave the name of "lead-pipe" symptom.

At my second visit I ordered the girl to walk, and, despite her disbelief in her power to obey, she was able with small help to get up and take a dozen steps, during which the heels did not touch the floor. Two years on bed or couch made this exertion difficult. But having once given her reason for hope, I put her back in bed, and for two weeks forbade exercise, while massage and tonics and good diet were employed. She gained rapidly in flesh. The corpuscular blood-count doubled after a week of massage;[1] all the functions began to re-

[1] See paper by John K. Mitchell on the "Influence of Massage on the Blood-count." American Journal of the Medical Sciences, 1894.

sume their orderly action. She was then allowed as a favor to rise and walk, and two weeks later was able to go home in excellent condition.

In the present case I insisted on this bed-ridden girl walking. I showed her that she could do so, and promised her that the pains in the back and leg would leave as she grew more and more able to exercise. Had I failed as to my predictions I should have doubly injured the case, but when one has had a long experience with hysteria it is easy to select the cases for abrupt exercise of authoritative influence. There were doubt and tears, but she walked, as ordered.

There is much to dwell upon in the cases I have brought before you. But now it is, above all, the prognosis and the treatment to which I desire to call attention. Charcot has said that very marked decrease of faradic contractility ought to make us suppose that the spinal cord has been invaded, and that the existence of a spinal organic lesion of more or less gravity will be placed almost beyond doubt, if, under the influence of deep sleep induced by chloroform, rigidity of the members only gives way slowly, or even persists to any marked extent, or if with this the faradic reactions are greatly lessened.

You will have seen that I do not altogether agree with this great student of disease, and that I approach these cases in a far more hopeful mood than I could do if I accepted the despair that his dictum would bring.

The treatment need hardly be set forth in detail. Above all, get your hysteric away from her audience. A hospital-ward is no place for her. But if you cannot deal with her elsewhere, treat the case as commonplace or trivial, and call no attention to it. For the rest, all the toning means are of use, and there are moral tonics not to be neglected, but for which a prosperous hour must be chosen.

It is well to say that the more you can improve the nutrition of joint, muscle, and nerve by mechanical and electric tonics, the better will be your chances of success when at last section of tendons becomes desirable.

I have put aside a final case of contracture in the male because of the doubts I long entertained as to its origin.

W. H. G., thirty-three years old, an unmarried railroad-clerk, was sent to me by Dr. W. S. Beebe, of Kirkwood, N. Y. Dr. J. E. Talley has made the following notes of his case: The man's father is living and well. His mother died of typhoid fever at fifty-seven years of age. He has one sister, in good health. There are no known family diseases. The patient himself had the ordinary diseases of childhood, excepting scarlet fever. He had pneumonia at nine years of age. He never drank to excess, nor has he ever abused the tobacco-habit. He certainly has had no syphilis.

The series of ailments that ended in what you see began with bronchitis in 1890. His physician said that at the time he was run down from overwork, and ordered him to take a vacation. He went away for two months and returned to his desk feeling much better. After working for a month, he was on November 6, 1890, "seized with chills," and had three in succession. After this he was confined to bed for fourteen weeks, suffering from what was described as "nervous prostration." His physician said that he had some lung-trouble, but that the major part of his illness was mere lack of power. It was not until five months later (April, 1891) that he was out of bed permanently, and was only able to walk with canes. He had then to use his eyes in walking, and was unsteady on closing them and in trying to stand. At this time, he tells us, the knee-jerk was present, and this is probable, as the patient is very intelligent and has studied his symptoms assiduously and closely.

During 1891 he got much better, and walked without a cane, except when going a long distance. He still continued to cough more or less during this time.

In March, 1892, he felt well enough to go down to El Paso, Texas, to take charge of an office. There he lost his cough, gained in weight, and was doing very well until August, 1893, when a "very dear" friend and fellow-worker died of hemoptysis. The shock of this loss, coupled with extra work, seemed to be too much for him, and again he began to fail.

From September 1, 1893, he had pains in his feet, which continued until December, 1893, when he took a mustard foot-bath for their relief. On the following morning he awoke to find his legs drawn up at the knees, just as they were when he came to me for treatment on March 15, 1894. The thighs were rigidly flexed on the abdomen at a little less than a right angle. There was also spastic adduction of both thighs. No other contracture existed at that time or since, except of the gastrocnemii. The contractions, however, continued to become more complete and more rigid. As to sensation at this time the man remembers nothing of value.

On admission to the Infirmary the contracted and symmetrically wasted state of the lower limbs described was very apparent. The right foot was flexed firmly against the buttock, a forcible pull on the foot being required to separate the heel from the buttock. The left foot and leg were in the same position, except that the heel could be separated from the buttock a distance of a foot-and-a-half by force. The hamstring tendons on both sides were very rigid, as were also the muscles of the thigh and leg on both sides. The man could move the toes of both feet fairly well, but flexion and extension at the ankles were limited. There was absolutely no available power above the ankles, every muscle being rigid.

The patient said that the wasting of the limbs was really not great, as he had always been very thin. The circumference at the middle of the right thigh was 35 cm., of the left 35½ cm., at the mid-

dle of the legs on either side 10 cm. The whole body was extremely emaciated. The hands showed disproportional wasting of the interossei muscles and of the thenar and hypothenar eminences. There was no clubbing of the fingers. The dynamometer registered 55 in either hand. The spinal column showed nothing abnormal, excepting scars of previous cauterization.

Sensation was normal until we examined the feet. In the left foot sensation as to touch, pain, and temperature was absent on the whole dorsum, the anterior third of the sole, and the heel. The mid-region recognized touch. On the right foot there was an absence of sensation on the first, fourth, and fifth toes; touch was felt in the third and fourth toes on both surfaces; also on the dorsum and on the sole generally, except at the heel. It was nowhere normal on either foot, but improved above the ankle until at mid-leg it seemed perfect.

These facts are interesting, because there is no account of early loss of feeling. It seems certain, however, that this anesthesia must have been an early symptom. The overwhelming pain appears to have detracted attention from the merely negative sign, loss of tactile sensation.

Pain had been felt in the legs before contraction came on, but was never severe, and was taken to be rheumatism. The pain that came after the contractions had lasted fifteen days was more severe and of a different character. It grew to be at last the absorbing feature of the case.

There have been no bedsores or evidences of grave trophic disorder. Co-ordination was good in the arms and fingers. Station and gait, of course, were not obtainable, the man being bedridden and very nervous.

The knee-jerk was not obtainable on account of the spasticity of the muscles, nor could we get ankle-clonus or muscle-jerks in the legs. The epigastric, abdominal, and cremasteric reflexes appeared to be normal, as was the elbow-jerk. The man has never had incontinence of urine, but has had to be catheterized some five times since 1893. He has had no priapism; and, in fact, very seldom has an erection. He has also had perfect control over the rectum.

Dr. Archibald G. Thomson reported upon the eyes: "The pupils are equal and dilated. They react in accommodation, but not to light. The media are clear. The discs are a trifle grayish, the arteries small. The fundus is pale. The muscular balance is good."

There was no reversal or contraction of the color-fields.

With the man on his back, the chest-expansion was 1¼ inches. The percussion-note was higher-pitched above the right than above the left clavicle, and a full inspiration heightened the pitch on the right side and but very little on the left. The whole right side moved less than the left. Respiration was a trifle harsh at the left apex, and expiration was here prolonged and more marked than inspiration, but of about the same pitch as elsewhere. There was very little change in vocal fremitus and resonance on the left side, but on the right chest anteriorly the voice was conveyed much more clearly than elsewhere. On full inspiration there were moist rhonchi at both apices, more marked on the right. Posteriorly the eleventh rib on the left showed a prominence, as if it had been broken.

On having the patient sit up it was observed that the left nipple was slightly higher than the right. The right chest moved more (½ inch) than the left during respiration. A musical murmur, systolic in time, was heard at the end of expiration over the base and at the apex of the heart. The apex-beat was found to be in the fourth interspace, with the greatest impulse at the sterno-costal junction.

Staining the sputum for tubercle-bacilli was negative; urinalysis also was negative.

It was evident that the lung-condition had nothing to do with the paralysis. There was much difference of opinion as to the cause of these very interesting contractures. The absence of a previous hysterical history led some of our staff to regard the case as one of spinal hemorrhage.

As to treatment I had no indecision. The great flexion of the thigh on the pelvis, as in Miss C.'s case, kept the sciatic nerve stretched at the notch. There was but one remedy. As to what more we should win besides relief from pain I could not anticipate.

At my desire, on March 29, 1894, Dr. Keen operated on the right leg, dividing the thigh-muscles at their attachments to the pelvis; also the inner and outer hamstring tendons. He could not bring the leg to a straight position even then on account of the rigidity of the parts, and for fear of tearing the contracted femoral vessels. The limb was dressed, a double-inclined plane and extension-weights applied, these to be gradually increased. The extension-apparatus slowly accomplished its purpose, but was somewhat hampered by the development of a small bedsore over the sacrum as a result of the necessity of keeping the man constantly on his back. This soon healed, and the limb was then more actively extended each day by increasing the weights.

As this extension at once eased and soon put an end to pain in the leg on which Dr. Keen had operated, it was thought well to treat the other limb in like fashion. This was done June 19, 1894.

On December 7, 1894, both Achilles' tendons were severed. The patient has now no pain, and has gained from day to day and month to month in the straightening of the limbs, in moral courage, and in increasing freedom from nervousness.

Except for an attack of diphtheria, which necessitated removing the man to the Municipal Hospital in December, 1894, until January 22, 1895, he has been making constant improvement. His present state (February 4, 1895) is as follows:

A faint systolic murmur is heard over the apex of the heart and at the base. No circulatory disturb-

ance exists. The lungs have cleared up. There is no cough or expectoration. The hemoglobin-value of the blood is 95 per cent., and the man looks ruddy. There is an absence of the neurotic facies. The muscles are less wasted, but firm, and respond well to the faradic current everywhere, even in the legs. There are no tender spots on the body and no evidence of neuritis. The man controls his bowels and urine normally. There is no priapism or other abnormality of the genital organs. The weight to-day is 101¼ pounds, being a gain of only 6¼ pounds since admission to the wards.

There is still general emaciation, but the thighs and legs are somewhat more wasted than other parts of the body. There are to be seen the scars of the operations on the thighs and legs. There are no excoriations, no clubbing, or other evidences of trophic disturbance other than those caused by lack of use of the muscles.

The right thigh is in a straight line with the abdomen as the patient lies on his back. The leg can be extended to an angle of 170° with the thigh. The right ankle is perhaps a little extended, the toes being slightly flexed.

The left thigh is also in a straight line with the abdomen, as is the left leg with the thigh as the man lies passively on the bed. The ankle, foot, and toes are in good position.

Both thighs can be freely flexed, adducted, and circumducted, and there is the same voluntary control over the knees, legs, and ankles. The toes are less freely movable. The man walked five feet with the assistance of the nurse and a chair to-day. The grasp is good and equal, and no other motor palsy exists.

The patient has taken tonics, cod-liver oil, etc., and since September 17, 1894, he has had massage and movements with faradism daily to the affected limbs.

Early in April Dr. William J. Taylor divided the muscles on the inner side of both feet. This was needed because of the swelling and pain in the feet when the man was long afoot, and which seemed due to the cramped form of these parts.

On May 11, 1895, the man was walking a little on crutches—and improving. After exercise the feet were still more or less painful. He has steadily grown better up to this date (June, 1895).

The case, as you have heard it, does not enable us to be sure as to the immediate cause of the trouble. G. has been asthenic—neurasthenic, if you please; he recovers, goes South, and, as a railway-clerk, is overtaxed and much worried. For ten days he has aches in the legs, and awakens at last with his legs drawn up.

Are these hysterical contractures? At first they could be relaxed under ether. Must we accept Charcot's dictum that this is a certain sign of their hysterical origin? There was probably some early loss of sensation, but if, as has been suspected, these spasms were due to a hemorrhage within or on the cord, we might well have had this symptom. I confess that there was too little disturbance to allow me to entertain the latter diagnostic theory. Here is a man who sleeps well and awakens with great and increasing contractions, and probably with more or less anesthesia. In time the reflexes fail or lessen; the electric reactions are quantitatively diminished, and the mechanical reactions lost. All this might come from a neurotic, functional spasm, and it all reads like the progressive story of an hysterical disorder. It differs in no wise from the cases of Miss C. and Miss H., except that there are no other hysterical signals flying, such as their more complete hysterias too fully show. Also in this (G.) case the reflexes have come back, the electric reactions are all better, and here and there we can call out movement by a blow with the hammer. At present G.'s legs are straight, or nearly so, and the muscles are all improving. Where and when these gains will end I do not know; but certainly so far, in the light of treatment, the case does not read like one of organic disease of the cord, nor like any form of neuritis.

My conclusion is that in this case we have hysterical contractions in the adult male, a rare phenomenon, in this country, at least, where we have the nervous temperament, but are not neurotic to the extent seen in the Latin races.

Fortunately these general contractures are rare. But, whether general or local, if they have proved during four or five months amenable to no medical means, then I counsel the use of the knife and the section of tendons. It is true that Charcot and others have described cases in which, after years, contractions ceased abruptly and the limb was as before. The statement should have had a long appendix of exceptions. In cases of moderate contracture, not drawing the part to an extremely acute angle, sudden recovery may leave the joint undamaged. But in grave cases this never can be the case with joints like the knee, which is always the most difficult articulation to deal with. A long, violent contraction of the flexors partly luxates the tibia backward, and results in joint-changes which, after years of contraction, are incapable of cure.

In these knee-cases, perhaps in all articulations long out of place, there is probably soon or late more or less of that kind of inflammation which is also seen in joints too long on a splint. If this be so, a part of the failures to respond to electricity may be due to the muscular wasting so commonly observed in connection with damaged joints.

But, whatever the cause, I have seen hysterical contractions in which, after section of tendons, the joints were too much altered to admit of useful restoration. The leg, bent at an angle of 45°, is brought, by section and the screw, to a much larger angle, but cannot be made straight enough for use. There is motion within limits, but with weak muscles and bent legs the effort needed for walking becomes

excessive. Under these circumstances crutches are essential, and there may arise a question as to the propriety of making the leg straight by an operation that will leave it rigid. Above all, I desire to impress upon you finally that a contracted limb is not a limb to confide to the rare relief brought or not brought by time.

I have desired to call attention in this paper to certain hitherto unnoticed clinical facts:

1. Two forms of hysterical contracture exist. One concerns single parts and limited groups of muscles. In this the contracture may last for years without the addition of organic changes in muscles, joints, or interstitial tissues. In this also sudden cessation of contracture is possible.

2. A form of contracture exists which attacks in succession one limb after another, until soon or late all or nearly all the voluntary muscles, as well as those of the trunk, may become involved. The cases of this group do not, in my experience, ever get well abruptly. In them the muscles, joints, and areolar tissues undergo serious organic changes.

In the first or limited form the muscles and the muscular reflexes remain unaltered, or are but little changed, and mechanical and electric responses continue to be normal or nearly so. In the second or generalized form, the reflexes are lost or interfered with late in the disorder, and the electric responses are quantitatively lessened, and may, in time, be almost altogether lost. It is only in this form, after years of life in bed, that we may expect to see changes in the cord. Whether these are merely independent accidents, or are the rare secondary products of the hysterical condition or of the organic changes this occasions in the peripheral nerves and muscles, we do not yet know.

ERUPTIONS SIMULATING THAT OF SCARLATINA.

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THAT the rash of scarlet fever can be closely simulated by various other eruptions is a fact, unfortunately, only too well known. The difficulty in diagnosis depending upon this similarity is often so great that a recapitulation of some of the conditions that may give rise to the confusion may not be amiss, although no attempt can be made to enumerate them all. Certain cases that have occurred in my own practice have been so puzzling at the time that some of them may be used by way of illustration of the points to be brought out.

As a matter of course, no disease can be studied from a single point of view or in the light of one symptom merely. Were the rash of scarlet fever all that physicians had to guide them, they would be far oftener at sea than they now are. On the other hand, could they always see the end from the beginning; could later symptoms, in the nature of things, appear with the first development of the rash, errors in diagnosis would be much less frequent.

To the matter of diagnosis in general, and to the ordinary symptoms of the disease, but little attention need be paid in this connection. The later course of the case usually makes the diagnosis plain. It is only the comparative study of the cutaneous eruptions that interests us at present.

The eruptions that most often resemble that of scarlatina are various forms of erythema. One of the most puzzling, although comparatively less frequent conditions, rendering the diagnosis of scarlatina difficult, is the occurrence of an erythematous rash attending tonsillitis. A cursory examination of medical literature has not shown me much written upon the subject, yet the condition is one that undoubtedly occurs. Its recognition is all the more difficult on account of the fact that the combination of sore-throat with eruption is exactly what we would expect to find in scarlatina. A few years ago I saw the following very characteristic instance of the condition:

An adult woman was admitted to the Hospital of the University of Pennsylvania, suffering from tonsillitis. A few hours later it was noticed that she was covered with a not very well developed rash, having all the characters of that of scarlatina. By the next day the rash had disappeared, and no desquamation followed, making the diagnosis of erythema reasonably certain.

It is, indeed, only to be expected that cases like this should occur frequently, when we remember that both erythema and tonsillitis are often local manifestations of rheumatism. I have known of cases in which there was no question of the rheumatic nature of the scarlatiniform rash, in which tonsillitis and an erythema exactly resembling the eruption of scarlet fever were associated with articular and cardiac manfestations of rheumatism. Such a case, too, was recently reported by Boyd,[1] in which tonsillitis was followed by a decidedly persistent erythema, with pain in the fingers and wrists, and in which, although scarlatina was at first strongly suspected, the later course of the case and the articular involvement removed all doubt. Sometimes, it must be remembered, we find cases that we suspect of being merely tonsillitis with erythema, but which turn out to be scarlatina. Instances of this nature show the importance of insti-

[1] Medical Record, February 2, 1895, p. 143.

tuting proper treatment and quarantine in all doubtful cases.

The condition known as surgical scarlatina may be considered in this connection. It is to some extent a very puzzling one, and one about which writers are not agreed. Some make the statement that surgical scarlet fever is simply scarlet fever occurring in a surgical case. Others take the ground that the disease is a manifestation of septicemia. It seems certain that some of the cases, at least, are not examples of scarlatina, although greatly resembling it at first. The distinction is most important, as the question of the danger to others must be considered. The following case illustrates the occurrence of septic erythema resembling the rash of scarlet fever:

M. S., aged eleven years, a patient at the Children's Hospital, suffered from caries of the right fibula. On November 15, 1894, a large sequestrum was removed by Dr. John Ashhurst, Jr. The temperature remained at about 100.4° until November 20. During the night from the 19th to the 20th there was found a rash covering the whole body, which was described in the clinical notes as "measly," and which extended from the roots of the hair to the soles of the feet. The temperature fell to normal when the rash developed. On November 21, at 8 A.M., the rash was still macular, but no longer looked like that of measles. By 11 A.M., at the time I first saw the child, the eruption looked precisely like that of a well-developed scarlatina. The throat was slightly red, the general condition excellent. There was still no fever, and the pulse was 92. On November 22 the rash was fading. On November 23 it had almost gone; it left an appearance like slightly injected "gooseflesh." On November 24 the condition was much the same. On November 27 all signs of the rash had gone. No peeling followed.

No isolation whatever was practised in this case, as the diagnosis was made early. Had the disease actually been scarlatina it is scarcely possible that other children would not have contracted it.

The disease known as puerperal scarlet fever is of the same nature as the surgical variety, viz.: usually erythematous and of a septic origin. Of course, true scarlatina may occur in the puerperium.

Another, and a very curious instance of an erythema that had considerable resemblance to the eruption of scarlatina is the following. The origin of the attack in this case I was never able to discover:

Mamie McF., aged seven, presented herself on June 30, 1890. She had been perfectly well the day before; had slept well, and had had no vomiting or fever. She woke in the morning covered with a rash, which the mother said looked then as it did when examined by me at about 11 A.M. At this hour the face was slightly swollen and puffy, and an indistinct reddish color was visible about the nose and chin. The eyes were not suffused. Over the front and back of the chest, and on the arms and thighs, there was a perfectly smooth, rose-red color, resembling in appearance in the denser portions more the eruption of erysipelas than that of scarlatina, inasmuch as there was an entire absence of the punctate mottling that characterizes the latter affection. In the less dense portions of the color the likeness to scarlatina was more pronounced. On the legs proper, and on the wrists, were some few papulo-macules the size of peas, and larger in area. The temperature was 98.6°. There was no redness or swelling in the throat, and no enlargement of the superficial cervical or other glands in the neck. The tongue was clean, and without enlarged papillæ. On June 21 the eruption was entirely gone.

This case might easily have deceived the unwary. Close examination would, however, have made one suspect rather the existence of *rubella scarlatiniforme*, to which reference will be made later, especially in view of the presence of the macules on the extremities. The sudden and complete disappearance of so extensive an eruption placed it beyond doubt in the class of the erythemata.

A scarlatiniform rash occurring after the administration of enemata has been described by Suckling and others. It has never been my fortune to meet with this. Very often the diagnosis between scarlatina and some of the rashes resembling it can be made only by the later course of the attack. If the peculiar peeling takes place we have good reason to suspect that we have had to do with scarlatina. This applies to the diagnosis between this disease and rubella and most of the instances of erythema, but it is a rule by no means without exception. That is to say, the absence of peeling would render the existence of scarlatina rather improbable, but its presence is not certain proof that scarlatina has existed. The following case is an illustration in point. It is probably to be considered one of septic erythema.

Helen P., aged ten years, had undergone an operation upon the septum nasi on November 28, 1894. On November 31st there was no fever, but pain in the nose. On December 1st, in the evening, a rash was found on the chest. There had been no premonitory symptoms, and the child had been well all day and apparently free from fever. The rash was bright red and extended over the front of the chest as far as the lower ribs and high into the armpits, but did not reach the back. The skin was perfectly smooth. The itching was quite annoying. On December 2d the eruption was paler in the morning, but bright again in the evening. The child had vomited, but this was after taking castor-oil. The general condition was good. On December 3d the rash was paler and peeling had commenced. This was identical with that seen in scarlatina, and was most marked in the armpits.

Of course the limited area of the eruption was almost sufficient to negative the diagnosis of scar-

latina, even without taking into consideration the absence of other symptoms. Yet we cannot make the limitation of the eruption to certain parts of the body a test for the absence of scarlet fever. As a matter of fact, the extent of the eruption is no guide in diagnosis. In malignant cases, as is well known, little if any rash may appear at any time. In very mild cases, too, the rash may be very limited in extent, as the following case illustrates:

Willie C., eighteen months old, while apparently still in perfect health and without fever, yet exhibited a slight erythematous rash upon the inner side of each thigh. I supposed it to be simply a slight erythematous eruption from an unknown cause, and gave this as my opinion. A short time later the characteristic peeling of scarlatina took place. Scarlet fever occurred, too, in another member of the family.

Cases far more puzzling than that of Helen P., already related, have been reported. For instance, we may recall the interesting ones published by Blanc,[1] in which recurrences of a widespread eruption, followed by desquamation, had several times caused physicians to make the diagnosis of scarlet fever in two patients. Similar cases have been observed by others both in this country and in Europe, and the disease has been given different names, such as *erythema exfoliativum recurrens, erythema scarlatiniforme*, etc.

There are other conditions that might cause difficulty in diagnosis if we depended upon the rash alone, and which, indeed, may sometimes give us trouble in spite of careful study. Various drugs are capable of producing an erythema that may look much like that of scarlet fever, although it oftenest takes the form of a maculo-papular rash simulating that of measles. Thus, for instance, quinin is capable of producing a scarlatiniform eruption. Antipyrin may do the same, although the antipyrin-rash is generally rubeolous in appearance. Copaiba may also bring out an erythematous rash. The use of the diphtheria-antitoxin has brought out the fact that this, too, or at least the blood-serum containing it, is capable of producing an eruption resembling that of scarlet fever. Belladonna may produce an eruption that may be very confusing. In the case of a little boy of ten years, suffering from scarlet fever, the homeopathic attendant had given so much belladonna that it was impossible at first to determine how much of the redness of the skin and dryness of the mouth was due to the disease and how much was caused by the drug.

A scarlatiniform eruption may occur in the course of different diseases. Rarely it is seen attending gonorrhea, independently of the use of copaiba, and it is then probably septic in origin. It may also occur with typhoid fever, usually early in the disease, and may exactly resemble the rash of scarlet fever.[1] As is well known, a scarlatiniform rash appears in many cases among the prodromal symptoms of smallpox. This may be widespread, although it is usually limited to certain regions of the body. In varicella, too, an erythema may be among the prodromes in exceptional cases. There have been a good many cases reported of the coexistence of varicella and scarlatina in one person. This does occur, but in many instances it seems very possible that the apparent combination has been due to the development of an erythema during the existence of varicella. Thus, in a case that I saw a few years ago, a child, while exhibiting the ordinary eruption of varicella, developed a rash that had all the appearances of the genuine eruption of scarlatina. I supposed that here was an instance of the coexistence of the two affections. However, the rapid fading of the color, the absence of any symptoms of scarlet fever, the failure of desquamation to appear, and the fact that no other children in the house contracted the disease, rendered it probable that the eruption was erythematous merely.

Diphtheria may sometimes, although not commonly, exhibit an erythematous eruption that is capable of obscuring the diagnosis. The fact that in malignant cases of scarlet fever the rash may be entirely or nearly absent, while the throat-symptoms are very pronounced, adds to the difficulty. Of course, the frequency with which diphtheria occurs in combination with scarlet fever is still another complicating factor. The case of Florence F., detailed later, illustrates the difficulty sometimes attending the recognition of either disease.

It would seem almost impossible that an affection with such a characteristic rash as measles could ever be confounded with scarlet fever, and such, indeed, is the case, if we are guided by the complex of symptoms of the two diseases. As far as the rash itself goes, however, it sometimes happens that the eruption of scarlet fever in malignant cases is a good deal like that of measles. In these cases a very imperfectly developed rash may be decidedly macular, although, it is true, it is nearly always in some parts sufficiently characteristic, with the presence of other symptoms, to render the diagnosis plain. It is rather scarlatina resembling measles than the reverse. The extracts from the history of the following case illustrate the appearance that the rash of scarlatina may sometimes assume:

Florence F., aged two-and-one-half years, was on March 5, 1895, taken sick with sore-throat and a scarlatina-like rash over the trunk. On the 6th the rash was poorly developed, while the temperature

[1] International Clinics, October, 1891.

[1] See article by Ohman-Dumesnil: Journal of the American Medical Association, August 2, 1890, p. 164.

was high. On the 7th a little white deposit was visible on the tonsils. The rash was now only slightly out. On the 8th large white patches could be seen in the throat; the urine contained albumin; the rash was more distinct. On the 9th the rash was more pronounced than the day before, and there was a diffuse, bright redness over the buttocks, but about the knees there were bright-red patches distinctly infiltrated with serum, and thus harder and slightly more elevated than the surrounding skin. On the right leg the rash was decidedly papular and looked not at all like that of scarlatina, but rather like that of measles. On the 11th the membrane was nearly gone from the uvula; the hands were swollen and red; the papular eruption was present about the wrists and knees, and several ruptured, flattened vesicles, like those of varicella, had appeared on the hands. On the 13th the throat was much better. There was, however, a good deal of discharge from the nose. The child was still heavy and stupid. On the 17th the throat was nearly clear; there was still much discharge from it and from the nose; peeling had begun two or three days before. On the 19th the temperature was still high, and membrane reappeared in the throat. On the 21st the general condition was evidently worse; the child was delirious; there was extensive sloughing on the right side of the throat inside and to less extent on the left. Cutaneous emphysema was present down to the upper part of the chest. The case need not be further followed. Klebs-Loeffler bacilli were found in the throat. The respiration became a little croupy and later distinctly stenotic. Membrane was discharged from the nose. The child died on the 26th.

The rash in this case was not at all characteristic of scarlatina. Although resembling much more that of measles, this disease could practically be excluded by the nature of the other symptoms. The more important question was whether we had here to do with diphtheria at the outset in combination with an erythematous rash; but the course of the disease, the temporary improvement, followed by a return of the throat-symptoms and the occurrence of peeling, make it practically certain that the case was one of malignant scarlatina, followed by diphtheria.

Finally, and perhaps most important, as it is most puzzling, is the fact that the rash of rubella very frequently simulates most closely that of scarlet fever—so closely, indeed, that in mild cases of the latter disease the diagnosis may be impossible until, perhaps, the characteristic peeling later clears up the uncertainty. So common is this similarity that in the article[1] previously referred to this form of the affection is designated *rubella scarlatiniforme*. The rash in these cases becomes universally confluent, is not at all elevated, and may exactly resemble that of scarlatina, except that one can usually find at the ankles or wrists a papular or macular marking at the edge of, or even in, the general diffuse redness. On this appearance the probable differentiation can often be based. So, too, rubella is likely to show at the beginning the macular rash, even though a diffuse redness appears in a day or two. Yet these diagnostic points, although of service, are very likely to play one false when most needed.

Cases of scarlatina occur in which the macular appearance of the rash on the extremities is quite evident; while, on the other hand, the eruption of rubella, unless studied throughout its whole course, may fail to exhibit any character that can be called distinguishing. The following two cases illustrate the difficulty that attends the matter. I frankly confess that in the first I made a diagnosis of rubella, and was afterward obliged to change it to scarlatina, while in the second the early diagnosis of scarlatina had to be substituted by that of rubella. In retrospect the diagnosis seems plain enough, but at the time it was most perplexing. The histories are given only in brief and with special reference to the appearance of the eruption.

Mattie C., aged four-and-a-half years, was on May 23, 1886, irritable. On the 24th she was feverish and drooping, and sick at stomach frequently. On the 25th a bright-red, diffuse rash covered the trunk. The thighs, legs and arms showed a mottled rash exactly like that of typical rubella. The eyes were slightly red; the throat somewhat sore. The existence of the mottling rendered the diagnosis of rubella justifiable, especially as the child seemed little ill. On the 26th the temperature was 100°; the throat was red; the tonsils were inflamed, and showed some white points. The tongue was bright red, except at a small central spot. The glands behind the sterno-cleido-mastoid were slightly enlarged; those under the jaw not so. The rash seemed evenly red everywhere. The case now looked more like one of scarlatina, although I did not believe it to be this on account of the previous mottled eruption. On the 27th the tonsills were still red; the rash was fading; it appeared elevated on the finger-tips, and somewhat on the legs. The child was feverish, and had talked in its sleep on the preceding night. The palms were deep red in color. A little earache was present, and also considerable pain in the abdomen. On June 1st the child was feeling in a manner entirely characteristic of scarlatina.

John P., aged twelve, came home from school on February 26, 1886, cold and feeling badly, and with an eruption developing. Later he had sore-throat, with some redness of the eyes, but no coryza. The rash was in the form of pea-sized and smaller macules, and the disease was supposed to be rubella. On the 27th the rash covered most of the body, and was confluent in many places. On the 28th the rash was well developed, and so widely spread and so punctate and characteristic of scarlet fever that the diagnosis of this disease was substituted for the earlier one. The temperature and pulse remained only slightly above the normal throughout the attack. There was no characteristic peeling, and

[1] Medical Record, February 2, 1895.

these symptoms, combined with the earlier appearance of the eruption, make it clear that the first diagnosis was the correct one.

Numerous cases like the last could be cited, but they would simply be repetitions. In the majority I have been able, I think, to make a correct diagnosis, although not upon the appearance of the rash alone.

To sum up, then, we find that the eruption of scarlet fever is not only liable to vary decidedly in different cases, especially of the malignant or very light forms, but that other eruptions may resemble the typical rash very closely; that the erythemata are likely to be very evanescent, and that this peculiarity aids in recognizing them, but that they by no means need to be of this nature; that peeling in a characteristic manner occurs in most cases of scarlet fever, but this may occasionally occur, although fortunately rarely, in other conditions, and, sometimes, in scarlet fever it is scarcely perceptible; that it is even possible for the eruption of scarlet fever to suggest the presence of measles, and that the eruption of rubella can in very numerous cases, with difficulty, if at all, be distinguished from that of the more serious affection.

So much for the difficulties of diagnosis as far as the eruption itself is concerned. With regard to the means of determining that we have actually to do with scarlet fever, and nothing else, the subject is far too large to be entered upon in this connection. It need only be said that it is important, above all things, to endeavor to make the diagnosis from the *complex* of symptoms rather than from the nature of any *one*, whether eruption, fever, tongue, pulse, or what not. In this way the careful physician will usually arrive at a correct conclusion, though not always.

URETHRAL DIVERTICULA.

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URETHRAL diverticula or pseudo-urethroceles, though sometimes classed together with true urethroceles or dilatations of the middle third of the urethra, constitute a distinct affection, differing from the latter both in etiology and physical signs. The urethral diverticulum consists of a cavity or pouch situated in the urethro-vaginal septum, usually about the middle third and communicating by a narrow opening with the urethra, which is not dilated, but is of normal caliber. In one of the cases reported by Routh the cyst communicated with the urethra by two openings. These diverticula vary greatly in size, some being only the size of a pea, others attaining that of a hen's egg or even larger. In a case operated on by Lawson Tait the size of the sac "was probably as great as that of the bladder." The cyst in this case "ran backward as far as the cervix uteri, and seemed to double up on each side of this structure into small pockets."[1]

The contents of the diverticulum consist usually of pus and urine. In one of Priestly's cases sebaceous matter was found in the sac. Piaseski[2] reports a case, operated on by Serfioti, in which a pipe-shaped calculus, the size of three small hazelnuts joined together, had formed in the diverticulum. It consisted entirely of phosphates. Various theories have been put forward as to the etiology of these diverticula. Santesson ascribes their origin to trauma, inflicted during labor or catheterization, or to rupture of a vaginal cyst into the urethra. Lawson Tait, from an analysis of five cases that occurred in his practice, believes that they are congenital. Winckel records two cases, which he thinks were due to inflammation of the urethral lacunæ. In one of these the walls of the cyst consisted of muscular tissue and their inner surface was lined with pavement epithelium. Routh, in reporting three cases, two from his own practice and one that had been operated on by Percy Boulton, says their "etiology seems to be: 1. Closure of the ducts of pre-existing urethral glands, retention-cysts resulting. Suppuration and ulceration into the urethra by a small, often valvular, hole follows, and the inflammation is kept up by urine trickling into the sac at each micturition. 2. Blood-cysts which have passed through similar changes. 3. The formation of pseudo-cysts by injury to the urethral floor during labor or menstruation."

Boulton considered the origin of the diverticulum in his case to have been suppuration and rupture of a blood-cyst, the result of injury received during labor. The wall of the sac was fibrous, and firmly attached to the surrounding structures. "It was not a true cyst. It contained dark-red, fleshy trabeculæ, suggesting organized blood-clot, and had no epithelial lining." In one of Routh's cases the cyst-wall consisted mainly of connective tissue. Its inner surface was the seat of an inflammatory process; but no epithelium could be seen. The arrest of a vesical calculus in the urethra has been also considered as a cause (Piaseski).

The symptoms are usually frequent and painful micturition accompanied by the sensation of a firm, tender tumor in the vagina, which causes dyspareunia. A quantity of pus, usually ammoniacal and varying in amount according to the size of the sac, is passed from the urethra and may cause consider-

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[1] Tait's Diseases of Women, 1889, vol. i, pp. 84, 85.
[2] Nouv. Arch. d'Obstét. et de Gynécol., 1892, p. 236.

able local irritation. Urethritis and cystitis are frequent complications.

DIAGNOSIS. On examination a firm, tender swelling is found situated in the urethro-vaginal septum, usually about its middle third; but when the cyst is of large size its upper limits may reach the cervix or even further, and, as in Tait's case, pass up into the lateral fornices. On applying pressure to the tumor a quantity of thin ammoniacal pus is discharged from the urethra. In Santesson's case, however, compression of the tumor caused its contents to be evacuated backward into the bladder. By examination with the electric urethroscope the opening in the floor of the urethra can be detected. Should any difficulty be experienced in doing so, the pus will be seen welling up from the aperture on applying pressure to the tumor while the urethroscope is being slowly withdrawn. That the tumor is not a simple dilatation of the middle third of the urethra is shown by the fact that a large-sized sound, introduced into the urethra, does not enter the sac during its passage into the bladder; but by carefully searching along the posterior wall of the urethra with a probe the opening can usually be discovered and the probe passed into the cyst. Unlike a true urethrocele the pseudo-urethrocele can be palpated as a definitely outlined cyst after its contents have been expressed.

TREATMENT consists in dissecting out the cyst and closing the cut surfaces with silk or catgut sutures. Passage of the catheter after the operation is unnecessary unless retention of urine supervenes. After dissecting out the diverticulum, should the parts not appear sufficiently healthy to allow of immediate reunion, which will be of rare occurrence, a soft catheter is introduced into the urethra and allowed to remain for from two to four days. The wound in the septum is dusted over with iodoform and covered with iodoform-gauze. The cut surfaces are then allowed to granulate up, or secondary suture may be performed.

MEDICAL PROGRESS.

Gonorrhea of the Uterus.—At the meeting of the German Gynecological Society recently held in Vienna, WERTHEIM (*Centralblatt für Gynäkologie*, 1895, No. 26, p. 699) maintained that next to the urethra the uterus is the most common seat of gonorrheal infection. In most cases the infection is direct and in many restricted to the uterus. The symptoms are always of acute onset. The distinction between an acute and a chronic stage is legitimate, both clinically and bacteriologically, although a sharp line of separation cannot be drawn. The infection gives rise to inflammation of the uterine mucous membrane, at first manifested by purulent catarrh and leading up to an interstitial endometritis. In a not inconsiderable number of cases of chronic course there results glandular increase—*i. e.*, a glandular endometritis. In addition to the changes in the mucous membrane there occur in many cases inflammatory alterations of the muscular layer, characterized upon the one hand by inflammatory infiltration of the muscular connective tissue, and on the other hand by hyperplasia of the walls of the vessels, leading ultimately to hyperplasia of the connective tissue at the expense of the muscular elements. The swelling and painfulness of the uterus observed in many cases are to be considered evidences of the metritis. The inflammatory changes are progressively less intense as the external os is approached. In some cases gonococci are demonstrable in the inflamed mucosa in greater or smaller number. In many cases, however, this demonstration fails both with the microscope and by culture. The deeper the layers the more difficult is the demonstration of gonococci. It is probable that gonococci are present in the inflammatory infiltrate of the muscular tissue, but the demonstration is as yet wanting. These changes are to be viewed as due to the gonorrhea, first, because the gonococci have been demonstrated in the mucous membrane; second, because in none of the uteri examined have any other bacteria been found; third, because these changes were also marked in all cases (5) in nullipara. Mixed infection or secondary infection appears thus to be as rare under these conditions as in gonorrhea of the uterine adnexa. The internal os uteri seems not to act as a barrier to the ascent of the gonorrheal process. The exacerbations in gonorrhea of the uterus are frequently dependent upon alterations in the nutritive medium as influenced by various unfavorable conditions (such as menstruation and coitus). In many cases, however, they are dependent upon renewed infection. The puerperium is an exceptionally unfavorable state, as during this period an extension of the gonococci to uninvolved parts very likely takes place frequently.

A Case of Akromegaly, with Temporal Hemianopia and Glycosuria.—At a recent meeting of the Société de Biologie, MARINESCO (*Le Mercredi Médical*, 1895, No. 26, p. 305) presented a case of akromegaly in a woman, thirty years old, with unusual manifestations. At the age of twenty-two years the patient had had epileptic attacks, occurring three or four times weekly, without aura, and with progressively diminishing frequency. Five years before coming under observation she was seized with vertigo and fell down two flights of stairs. Six months later it was noticed that the feet were increasing in size, and soon a similar change was observed in the hands, face, and chest. For a year there had been increase of thirst and appetite. The urine was passed in excessive amounts and stained the linen. There was considerable loss of flesh and strength. The patient's face was greatly enlarged, particularly in its vertical diameter; the inferior maxilla was prominent; and the lips were thick, particularly the lower. The nose was greatly enlarged, its septum and alæ being quite voluminous. The sternum and clavicles were also increased in size and the breasts were atrophied. Cervico-dorsal kyphosis was present. The hands were enlarged and thickened in both their longitudinal and transverse diameters. The feet were enormous, but the hypertrophy involved especially the antero-posterior diameter. The tongue was greatly enlarged, its surface being marked by elevations and de-

pressions. The mouth was dry and the gums painful. The area of cardiac percussion-dulness was increased. At the base a presystolic murmur was heard, continuing into the systole. The lower extremities were edematous. Tactile, thermic, and painful sensibility were unaltered. Excepting sight the special senses were normal. Vision was impaired, being one-half in the right and one-third in the left eye. The pupils were paretic, in greater degree upon the left; their consensual reaction was preserved. There was found bitemporal hemianopia; but the hemiopic pupillary reaction was not present. There was amblyopic divergent strabismus of the left eye with passing diplopia. The patient passed from ten to twelve quarts of urine daily, containing an ounce-and-a-half of sugar to the quart and traces of albumin.

The Immunizing and Curative Action of the Antitoxic Serum of the Calf Against Typhoid Infection.—BEUMER and PEIPER (*Zeitschrift für klinische Medicin.*, Band 28, Heft 3, 4, p. 320) detail observations showing that animals can be rendered immune to typhoid infection by previous treatment with dead typhoid-bacilli. It was further found that such injections were well borne by a healthy person. Finally eight cases of typhoid fever were treated upon the same lines with favorable results. Further experiments showed that the blood-serum of untreated calves constituted an unfavorable medium for the development of typhoid-bacilli, and that of animals previously inoculated with dead typhoid-bacilli constituted a still more unfavorable medium. It was next determined that animals treated with the antitoxic serum resisted typhoid fever, and that in cases already infected the disease pursued a favorable course. These observers found, as have others, that the typhoid-toxin is largely contained within the bodies of the micro-organisms, and is present in but small quantity in the culture-fluid.

Chronic Gonorrheal Cystitis cured by Influenza.—GOLDBERG (*Centralblatt für innere Medicin*, 1895, No. 26, p. 625) has reported the case of a man, twenty-three years old, in which, following an attack of influenza of ordinary severity, a cystitis of gonorrheal origin of more than a year's duration that had resisted active treatment disappeared.

THERAPEUTIC NOTES.

The Treatment of Diphtheria with the Antitoxin.—SPRINGORUM (*Deutsche medicinische Wochenschrift*, 1895, Nos. 31 and 32) reports that from the middle of August, 1894, to April 1, 1895, 206 cases of diphtheria in children were treated at the City Hospital of Magdeburg with the antitoxin, with 78 deaths, a mortality of 37.9 per cent. At first the treatment was carried out only irregularly, moribund and hopeless cases, as well as those of favorable prognosis, being excluded. Subsequently all children were inoculated that presented involvement of the larynx and evidences of septic intoxication, and also those with an unfavorable prognosis. Of 482 cases of diphtheria treated during the same period without the antitoxin, 122 terminated fatally—25.3 per cent. One-hundred-and-thirteen of the cases treated with the antitoxin required tracheotomy, with 52 deaths—46 per cent., while among the 93 not requiring tracheotomy there were 26 deaths—27.9 per cent. On the other hand, among the cases treated without the antitoxin, 140 cases required tracheotomy, with 78 deaths—55.7 per cent., while 342 did not require tracheotomy, with 44 deaths—12.8 per cent. In addition to the treatment with the antitoxin, applications of cold were made to the throat, and gargles of potassium permanganate and aluminum acetate were employed. Young children received a mixture of ferric chlorid and potassic chlorate. When the deposit was extensive and croupous manifestations were present, inhalations of a solution of sodium chlorid were practised. Diphtheric inflammations of the nose and ears were treated with irrigation, and coexistent bronchitis with expectorants.

According to the monthly report of the Bureau of Health of Denver, Col., it appears that in the eight months since December 1st, when the antitoxic serum became available for use, there have occurred 112 cases of diphtheria, and of the total number 25 died. Of these cases, 37 (all but three being identified by bacteriologic examination) were treated with the antitoxic serum, and of these but three died—a mortality of 8 per cent.; 75 cases (of which not more than 30 were determined bacteriologically) were treated without the antitoxin, and 22 died—a death-rate of 30 per cent.

In the Treatment of Gonorrheal Arthritis, BALGER (*Corresp.-bl. f. Schw. Aerzte*, 1895, No. 15, p. 480) immobilizes the member involved and applies to the affected joint an ointment consisting of

℞.—Acid. salicylic.	10
Olei terebinthinæ	10
Axungiæ porci	100

After the acute stage has passed and the temperature has not exceeded 98.6° F. for several days, the patient is given baths of ten or fifteen minutes' duration, prepared by adding to the usual amount of water from three ounces to a pint of a mixture consisting of

℞.—Olei terebinthinæ	100
Sodii carbonatis	500
Aquæ	1000

Or

℞.—Emulsionis saponis viridis . .	200
Olei terebinthinæ	100

Instead of the full bath a local bath containing a proportionate amount of the turpentine-mixture may be employed.

The Employment of Guaiacol as a Local Anesthetic.—LUCAS-CHAMPIONNIERE (*Bulletin de l'Academie de Médecine*, 1895, No. 30, p. 146), having observed distinct relief from pain from the application of an ointment containing guaiacol to a burn, was led to employ the same agent by subcutaneous injection for various anesthetic purposes. The results were eminently satisfactory and unattended with unpleasant features. The anesthesia produced compared favorably with that due to cocain. At first a solution of guaiacol in sterilized oil of almonds was made, but later a solution in oil of olives. The strength of the solution was at first 1 : 10, but later 1 : 20. A syringeful thus contained about 10 centigrams or 5 centigrams, respectively. The mode of procedure is especially applicable in minor surgery. The anesthetic effects are observed in from five to eight minutes after the injection.

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THE MILK-QUESTION.

ALTHOUGH the milk-question has probably always been a subject of warm discussion, never has so much been said and written upon it and from so many different points of view as in the last five years. The bacteriologist, the veterinarian, the pediatrist, the chemist, the legislator, and even the philanthropist have busied themselves with the matter; medical journals have teemed with literature pertaining thereto; commissions have been appointed to investigate the milk-supply of cities; many laws have been proposed to regulate the traffic; large industries based upon the deductions of specialists have been put into operation; private charity has been stimulated to establish depots for providing the infants and invalids of impecunious families with pure and sterile milk; and yet the death-rate of children under five years of age shows little or no reduction, and hand-fed babes die in summer now as they did twenty years ago.

We have thought that a short review of the situation as it presents itself might prove of interest if not of value, although we regret that we have no solution of the problem to offer.

First of all, chemists have been engaged upon new analyses of human milk, and find reason to estimate the percentage of albuminous matters at lower figures than have been given in previous formulæ. In the formulæ of König, Pfeiffer, and Leeds about 1 per cent. of albuminoids is given as the amount commonly present. Heubner, Forster, Hoffman, and Johannisen[1] find that the average amount is nearer 1 per cent. than 2 per cent.; Heubner places the figure at 1.05 per cent. and Hoffman at 1.07 per cent. Dr. A. V. Meigs, thirteen years ago, in a paper read before the Philadelphia County Medical Society,[2] contended that human milk never contained more than 1 per cent. of casein. In order therefore to make cow's milk correspond with human milk the proteids will need to be reduced two-thirds instead of one-half, as was the former custom. Wroblewski[3] has studied the nature of the casein of human milk as compared with that of cow's milk and finds that the former contains less carbon, nitrogen, and phosphorus than the latter and more hydrogen and sulphur. That the caseins of the two fluids never behaved alike has long been known, and the failure to sufficiently recognize this fact may account for some of the unsuccessful attempts in infant-feeding attending the substitution of cow's milk for human milk.

Biedert believes that the less digestible casein present in cow's milk constitutes a more favorable medium for bacteria to flourish in. Heubner,[4] however, has not been able to find in the feces of healthy children fed on cow's milk a greater quantity of undigested casein, though he has found a greater amount of other nitrogenous matters.

The importance of milk as a factor in the causation of digestive disorders in the infant has attracted the attention of many medical men, and the literature on the subject is quite voluminous. According to Krisowski,[5] of 1000 breast-fed infants only 7 die from digestive disorders, while of 1000 fed on cow's milk 67 perish from such diseases. Although the chances for living are very poor for the hand-fed babe, the mortality of the first year of life is extremely high for all infants. Eröss[6] finds that 44.8 per cent. of all children that die in the first month

[1] Jahrbuch f. Kinderheilkunde, 1895, vol. xl.

[2] Transactions of the Philadelphia County Medical Society, vol. iv, 1881–82.

[3] Mittheilungen aus d. klin. u. med. Inst. d. Schweiz, vol. ii, Heft 6.

[4] Berliner klinische Wochenschrift, 1894, No. 37.

[5] Deutsche Vierteljahrschrift f. öffentliche Gesundheitspflege, xxvi, 1894.

[6] Zeitschrift f. Hygiene, B. xix, Heft 3.

of life, die before they are a week old; that 25 per cent. of the first month's mortality occurs on the first day of life, and at least 10 per cent. of the deaths of the first year happen within a month after birth. While noting these facts we must not ignore causes other than those relating to nutrition that affect infants fatally. The children of the poor have a much higher death-rate than the children of the rich. The impure air of closely crowded rooms may affect injuriously a young infant's health as much as improper food. According to Fischl, Epstein, and Eröss, septic infection through the navel is responsible for many of the deaths in the newly born.[1] In such facts as these may be found one of the reasons why improvement of the milk-supply has not as yet been followed by any considerable lowering of the death-rate.

Neumann,[2] in his own clinic, finds that the children suffer equally from digestive troubles whether they are fed on milk direct from the cow, so-called country milk, or milk that has passed through the hands of several dealers and is retailed over the counter. His patients are derived chiefly from the poorer classes, and therefore the food is not the only disease-producing factor.

To the very long list of substitutes for human milk there have recently been added several modifications of cow's milk, considered of value by their introducers. Among these is the "Fett-milch" of Gaertner.[3] This retains all the cream, the milk being first diluted with an equal bulk of water and the mixture being placed in a specially constructed separator, which allows one-half of the proteids to pass off with the skim-milk. Only a slight addition of sugar is needed to bring the product up to the required standard. Kehrer, on the other hand, uses a milk-serum obtained by the rennet-ferment, and he claims that in this process the digestible proteids alone are retained. Cream is then added to supply the amount of fat needed. Hempel,[4] in order to avoid the use of cow-milk casein, adds egg-albumin to a mixture of cream, milk-sugar, and water, and claims good results from this "egg-albumin milk." Many authorities prefer skim-milk, with cream added, to the whole milk; and as skim-milk, in the larger dairy-establishments at least, is obtained by means of a centrifugal separator, the product is freed of the dirt that it usually contains after milking.

Much has been said for and against the theory of the infectiousness of milk from tuberculous cows. Very few investigators have ever been able to find the bacilli of tuberculosis in the milk of cows not suffering from disease of the udders. An investigation undertaken by Dr. H. C. Ernst for the Massachusetts Society for Promoting Agriculture, and extending over a period of two years, conclusively showed that cows whose udders were unaffected, yet who were suffering from tuberculosis in other organs, yielded milk in which tubercle-bacilli were found; and such milk when fed to healthy calves rendered them tuberculous. Of 36 cows under examination 12 produced milk in which tubercle-bacilli were detected on one or more occasions, and of 21 healthy calves fed on the milk of these cows 8 became affected with tuberculosis.

When we consider that according to Peters[1] 26 per cent. of 165 herds examined in seventeen North American States were found tuberculous, and that the statistics of German abattoirs reveal the fact that from 10 per cent. to 15 per cent. of all the cattle slaughtered are found to be tuberculous, the danger of infection from the use of milk cannot be overestimated. The laws that have been enacted in several States looking toward the destruction of tuberculous cattle cannot in our estimation be too rigidly enforced, if the results reached by Ernst are at all worthy of acceptance. The experiments themselves are of such a simple nature that the results ought to be speedily confirmed or corrected by other authorities.

Another question that has been the subject of much discussion is that of milk-sterilization. If milk is fatal to young infants because of the bacteria that find in it a favorable soil for development, the destruction of these germs by heat ought to render the product innocuous and harmless. How to destroy the bacteria without injuring the value of the milk has been the problem.

Flügge[2] persists in the statement previously made by him that, in order to destroy the dangerous germs that are likely to infect milk and that cause peptonization, a higher degree of heat than the one used in Pasteurization is necessary, and that for ordinary

[1] To some of these conditions attention has been forcibly called by Crockett in THE MEDICAL NEWS of August 3, 1895, p. 119.

[2] Berliner klinische Wochenschrift, 1894, No. 20.

[3] Wiener medicinische Wochenschrift, 1894, No. 44.

[4] Deutsche medicinische Wochenschrift, 1894, No. 44.

[1] The Report of the Massachusetts Society for Promoting Agriculture, Boston, 1895.

[2] Zeitschrift f. Hygiene, 1894, vol. xvii, part 2.

purposes cooking on a water-bath for ten minutes is as effective as any process of sterilization now in use. On the other hand, many authorities, including Baginsky, Troitsky, and Backhaus, still urge the use of the ordinary Soxhlet form of sterilization, and claim for it that if a perfectly sterile milk is not obtained thereby the procedure is far preferable to cooking and the product is at least much better than raw milk.

Baginsky[1] shows that milk is rendered harmful through three causes: First, from the non-pathogenic germs that set up various fermentations; second, from pathogenic organisms and their toxic products; and, third, from the germs that are present in the intestine of the child and that find in the ingested milk a suitable nidus for the generation of toxins. Sterilization can only partially lessen the dangers from the first and second causes, but it cannot affect the third.

Auerbach[2] considers the application of steam at a temperature of 115° C. and under pressure for a few minutes as effective as any form of sterilization.

Backhaus[3] contends that the advantages of sterilized milk are greater when the milk is prepared in large establishments than when it is sterilized by the consumer; the liability of contamination by frequent handling is lessened and the chances are that the milk is in a fresher condition.

All writers are agreed upon the necessity of keeping the dairy strictly clean, of observing the rules of cleanliness in milking, and in the transportation of milk, cooling the milk immediately after it leaves the cow and keeping it cool until it can be sterilized. Of course, no amount of precaution on the part of those who prepare the fluid will be effective if the sterilized product is exposed in a filth-laden atmosphere by a careless or ignorant mother. Bottles containing just sufficient milk for one feeding are generally advised and are to be preferred to the preparation of milk in bulk.

In many European and a few American cities milk can be had prepared with great care and according to any formula; the dairies are under strict supervision, the milk is carefully guarded from contamination, is examined frequently by chemists and bacteriologists, and is treated according to scientific principles. In Göttingen, Germany, milk is commonly sold for five cents a quart; while carefully prepared "children's milk" can be had for ten cents a quart. Sterilized milk can be bought in Philadelphia, in separate bottles holding eight ounces each, for twenty cents a quart.

Private philanthropy has established "sterilized-milk depots" where good milk can be obtained in sterile and unsterile condition for less than cost. Some of these organizations have been called into existence simply to satisfy a desire for publicity and notoriety, and have met with deserved failure. In other cases lack of technical knowledge, together with business inexperience, have caused the attempt to be abandoned, but most often the expense has been too heavy, and the money that a charitable public was expected to contribute was not forthcoming.

Neumann, of Berlin, and others who have been working among the children of the poor hold that the municipality should take upon its own shoulders the maintenance of suitable dairies and supply the children of the poor with proper nourishment at cost, as it now furnishes its inhabitants with pure water and endeavors to keep the air pure. This is one step further in the line of recent legislation, both in Europe and America, tending to increase the responsibility of the State in preventing disease, and if an improper milk-supply causes the death of thousands of infants, why not endeavor to prevent this waste of child-life by turning dairyman and giving every one the opportunity to obtain the purest and safest milk possible? Such at least are the arguments of those who favor State control. Paris has in connection with one of its municipal crèches a dairy controlled by the municipality, and children's hospitals and foundling-institutions have been urged by various writers to manage their own dairies. France is very desirous of increasing her population, and is endeavoring to do so by preventing waste. Other countries have not yet reached the point where the births per 1000 are less than the deaths, and therefore are not yet so much concerned about the 25 per cent. mortality of yearlings.

If the mammary gland of the human female is becoming atrophied, and infants do not thrive on cow's milk, no matter how carefully prepared or modified, might it not be well to consider what can be done to furnish all infants with their proper food, namely, human milk. If the child can be fed at the breast during the first year of its life the chances are ten to one that it will live be-

[1] Berliner klinische Wochenschrift, 1894, No. 43.
[2] Therapeutische Monatshefte, vol. xix, No. 1.
[3] Berliner klinische Wochenschrift, 1895, No. 26.

yond its fifth year, and that period past, the expectation of life is a pretty good one. Would it not therefore be well for medical men to direct their energies toward bettering or rather increasing the number of human milkers instead of looking for substitutes. If physical reasons prevent a woman from giving suck to her own child, the causes and the means to overcome the obstacles ought to be discoverable.

If, as in many cases, personal convenience is at the root of the trouble, then surely society should be taught its duty, and public opinion be so educated that it will consider it a disgrace and a crime for a woman to refuse to nurse her offspring when she is capable of doing so.

Not only is such an act an unwarranted cruelty inflicted on the infant, but in a large percentage of the cases it is as fatal to the child's life as if it were disposed of in some fouler way. The mother who, because of poverty, abandons her offspring, is sent to the work-house, and the child is taken from her. Is it less culpable for a mother to refuse her infant its proper food when that food is at hand?

If the time and talent now expended in endeavoring to obtain a pure supply of cow's milk were directed to this other question, and the subject freely discussed in the lay press as well as the medical journals, we would have a lessened infant death-rate and the problem "how and what to feed the baby" would not excite so much attention as it now does.

EDITORIAL COMMENTS.

Medical Education in the United States.—The last ten years have shown no diminution in the attendance at our large medical schools, notwithstanding the fact that entrance-examinations are more rigid, that the course has been lengthened in most cases two years, and that the State examinations make the requirements for the practice of medicine more severe.

In some of the schools the total attendance for the last five years has exceeded that of the previous five years by 60 per cent. Dr. Reilly, in the *Journal of the American Medical Association* of January 12, 1895, places the increase in the attendance at 101 medical colleges at 22 per cent., for 1894-95, as compared with previous years.

In many of the announcements that have been issued this year, the adoption of the compulsory four-years' course is heralded. In Philadelphia the Medical Department of the University of Pennsylvania, Jefferson Medical College, and the Woman's Medical College are now four-year schools. The Baltimore Medical College, the College of Physicians and Surgeons of Baltimore, the Women's Medical College, and the Medical Department of the Johns Hopkins University also demand a four-years' course. The Georgetown and Columbian Universities of Washington and the Howard Medical College of the same city have likewise adopted the requirements of the Association of American Medical Colleges. This by no means exhausts the list of four-year schools. We have simply mentioned those that have been most readily accessible. Many Western colleges, as well as Yale and Harvard, are also in line. Only one school in New York State, viz., the Medical Department of Columbia College, has a compulsory four-years' course.

The New York law requires three full years' study, the Attorney-General ruling that this means thirty-six months; yet only three courses of lectures are necessary, so that a student may study with a preceptor eighteen months of the thirty-six and attend college the other eighteen, or even spend less time at an accredited school. The wording in some of the recently issued announcements is rather ambiguous. In accordance with a resolution adopted June 7, 1894, by the Association of American Medical Colleges, attendance upon *four* full courses of instruction, of not less than six months' duration each, will be required of all who intend to graduate in 1899 or thereafter.

Thus in the catalogue of the Western Pennsylvania Medical College, among the requirements for graduation (p. 15), it is stated that the candidate for the doctorate "must have studied medicine for four consecutive years and have taken *three* full courses of lectures." And on p. 14, at the top of the page, it is stated that the time of study required is four years, including *four* full winter terms of lectures. In this college matriculates of 1895 can graduate in 1898.

The Colorado School of Medicine, on page 10 of its announcement, says: "Hitherto the course has been of three years' duration; but students who take their first course of lectures in 1895, or thereafter, must attend four full courses of lectures, no two of which can be taken in the same year;" and on page 25, "all students who enter college on and after September, 1895, must have attended *four* full courses of lectures before they can become candidates for graduation." There is no mistaking the meaning here. The wording of the resolution of the Association of American Colleges would lead one to infer that the four-years' course was compulsory only for those who intended to graduate in 1899, and that those who matriculated in September of this year could graduate in 1898. The greater number of colleges have interpreted this as coming into force this year, and are therefore four-year schools from September, 1895.

The advances along the line of medical education in this country in the past ten years have been truly great, but there is still room for much-needed improvement. First of all must come the abolition of State lines. We must have uniform requirements for admission, uniform requirements for graduation, and uniform laws for registration. The right to practise in one State should carry with it a right to practise in all States. Only then will the American medical diploma have a worthy meaning for our *confrères* abroad. The licence to practise medicine should be a Federal licence, granted by duly appointed Federal examiners; and all colleges should be made to act in conformity with rules established by them.

The Index Medicus.—We desire to call attention to the communication of Dr. John S. Billings, one of the editors of the *Index Medicus* from its foundation, in another part of this issue of the NEWS. As will be seen, the number of subscriptions already reaches 48, and it should be an exceedingly easy matter to make up the guarantee-number of 200. If every medical body in this country with a membership of 25 or more would make itself responsible for one subscription the requisite number would soon be reached. Nor would it be too much to expect all of the medical colleges to do likewise. The question of the continuance of the *Index* is such a vital one, and the needs for its effectuation relatively so insignificant, that it would simply be disgraceful if the present effort should fail. The response to this final appeal should be immediate and liberal.

As to periodicity of appearance of the revised *Index* we think a monthly, as heretofore, would be preferred by most medical literary workers, but a quarterly would probably entail less labor upon the editors and likewise less cost for publication.

The Use of the Clinical Material of the Municipal Hospital for Teaching.—It would be a decided advantage to the medical students of Philadelphia if the clinical material of the Municipal Hospital for contagious diseases was in some way utilized for their instruction. Comparatively few of those who graduate in medicine have the opportunity, as students, to see cases of the exanthemata, measles, varicella, scarlatina, smallpox, and yet when called upon they are expected to recognize such diseases at once, and are often censured for delay or for mistaking them for other maladies.

The great danger to the community from professional ignorance on this subject must be obvious, and the early recognition by the medical attendant of a case of variola or scarlet fever may be the means of preventing a serious epidemic. Under proper precautions it seems to us that members of the graduating classes of the various medical schools could be admitted in small groups to the wards of the hospital and there be shown a few typical cases. The knowledge thus obtained cannot be offset by any didactic teaching, and cannot fail to leave a lasting impression.

Collection of City Garbage.—While there has been a decided improvement of late in the manner of collecting city garbage, owing to the introduction of closed iron carts, yet, the placing of garbage in all sorts of boxes and small buckets on the sidewalks of our city, when the passerby must inhale the odors that such garbage emits, is an evil that ought to be remedied. Often the receptacles are overturned and the contents are thrown into the street, where they lie until cleaning-day. A garbage-decorated sidewalk may have some attraction for the artist, especially at this season of the year, when the coloring is quite varied and rich; but the sanitarian and the ordinary individual would be much better satisfied if the mess were kept covered, out of sight, and out of smell, although not out of mind.

A move in the right direction is the use of public garbage-cans. The lids should be so attached that they cannot be lost, and regular disinfection would probably greatly lessen the offensiveness of the odors arising from decomposing material.

Progress in Medical Education is urged, so far as relates to the Harvard Medical School, by President Eliot, the specific suggestions consisting: first, in the requirement of a degree in arts, science, or letters as an entrance-condition; this requirement to become operative in the year 1900. He also urges the shortening of the college-course to three years. The second change he would advise is the establishing of elective courses in medicine, so that the amplitude of instruction would be such that to take all the possible courses supplied by the faculty a single student would require eight, twelve, or twenty years. The third thing desirable for the Harvard school is a hospital of its own, in order that teachers may have clinical opportunities. We sincerely trust that all the suggestions may be realized, as they are beyond question in the interests of genuine progress.

Orthographic Ignorance, etc.—Our attention has been called to the fact that in the list of words taken from the papers of applicants for the licence to practise medicine and examined recently in Pennsylvania appear the spellings "draft" and "woolen." The list given was furnished by one of the examiners, and these two words were inadvertently permitted to remain, although they have the sanction of the best authority and are preferred by THE MEDICAL NEWS itself. In this connection we would also call attention to the letter on "Preliminary Examinations in Medical Colleges," on another page, from an intelligent graduate of 1895, who points out how some of the mistakes in spelling may have occurred, and who also places the blame for some of the failures where it properly belongs.

CORRESPONDENCE.

LONDON LETTER.

The Meeting of the British Medical Association.

THE annual meeting of the British Medical Association, which was brought to a close last week, was the largest gathering of that body ever held. The total attendance was not much less than three-thousand, including some two-hundred foreign visitors. This number, respectable as it is, fell considerably short of the expectations of the Executive Committee, who had hoped that at least five-thousand or six-thousand members would have taken the opportunity of combining the *utile* of scientific edification with the *dulce* of entertainments and festivities such as London offers in the season. As it was, the meeting was much larger than the average.

The Association has now thrice held its annual meeting in London—first in 1862, when it numbered only 1500; then in 1873, when its membership had grown to 5400; and now in the present year of grace, when it is 16,000. In its earlier days the Association was for a considerable time on the verge of bankruptcy; now it has assets to the amount of £60,000 ($300,000) beyond liabilities, and an income from its *Journal* of nearly £5000 ($25,000), which, with better management, might easily be doubled. Even in 1873 it was a very unimportant body, with little influence in the profession and none at all in the nation; now through its *Journal* it speaks with a voice that makes itself heard even amid the din of political battle, and through its Parliamentary

Bill Committee it can impress its views on legislators and governments.

By the unanimous testimony of all who were present the meeting was, both from the scientific and from the social point of view, a distinct success. The gathering was not thrilled by the announcement of any discovery likely to mark an epoch in the history of the healing art, but there were some good discussions, and on the whole the scientific work was, in Bacon's words, "frugiferous," as well as "luciferous." The general addresses were below the average of such discourses. That of the President, Sir Russell Reynolds, was a homily *de omnibus rebus et quibusdam aliis*, atrophic in thought, anemic in expression, loose-jointed in structure, and inaudible in delivery. The "Address in Medicine" (by Sir William Broadbent, the "well-beloved physician" of the Rothschilds and other leaders in Israel) was a mixture of second-hand erudition and first-hand twaddle. The "Address in Surgery" was delivered by Mr. Jonathan Hutchinson, who *more suo* was didactic. He gave an instructive account of the difficulties that ovariectomy and lithotomy had to encounter in gaining a footing in London. Perhaps the most notable part of the address, however, was Mr. Hutchinson's uncompromising declaration that "no one ought now to die of cancer of the tongue, for nothing except neglect of the early stage can bring about such a result." Yet thirty or forty years ago so bold and so skilful a surgeon as James Syme, having had three fatal results in succession after excision of the tongue for carcinoma, was so disheartened that he said he would never attempt the operation again.

In the section of medicine, the President, Dr. Pavy, took for the subject of his opening address "Microbes, Toxins, and Immunity;" he is something of an old fogy, and, having nothing in particular to say, he said it not ungracefully. The section in surgery was opened with a good address on "The Surgery of War," by Sir William MacCormac, whose scalpel has, under the auspices of the Red Cross Society, flashed on many a battlefield. He dealt with the wounds made by the new magazine-rifle bullet, which he does not, like some of our army-surgeons, "regard as a perfect weapon from a humanitarian point of view." In opposition to certain high authorities he holds that in the future wars will be bloodier than in the past. In connection with this matter, it may be mentioned that Surgeon-Colonel William Taylor, of the Army Medical Staff, who accompanied the Japanese army through all the operations of the recent war in the East, has sent in a report to the Government embodying the results of his observations in the field, particularly on this point of the injuries inflicted by the new bullets. The publication of this report is looked forward to with much interest by surgeons, but heaven only knows when it may see the light, for in government departments the period of literary gestation is often indefinitely protracted.

In his presidential address to the Section of Obstetric Medicine and Gynecology, Sir William Priestley (whom Sir William Fergusson once irreverently described as "a fumbler of aristocratic vaginæ") raised his voice against the promiscuous spaying and other surgical atrocities of which women have in recent years too often been the victims. The protest is a little belated, as far as this country is concerned, for there has for some time past been a very distinct subsidence in the epidemic of operative fever that raged in hospitals for diseases of women. Gynecology at one time threatened to degenerate into a form of sport; operators "bluffed" against each other with statistics; they "compiled" their "centuries" as Grace does in the cricket-field, and they strove to break the record of competitors. Owing partly to the force of professional opinion and partly to the recent obscuration of one or two stars of the first magnitude in the gynecologic firmament, this form of sport is less popular than it was a few years ago.

Mr. Ernest Hart, the President of the Public Health Section, in his opening address, cursed the Indian Government for its backslidings in the matter of sanitation with a fervor and a tropical luxuriance of invective that St. Ernulphus might have envied. His theory of cholera is delightfully simple; it is all the fault of a fossilized officialdom that cannot or will not see that the one thing necessary to keep it off is boiled water. The true hygienic palladium is the tea-kettle. This easy means of sanitary salvation Mr. Hart preaches with what Indian officials doubtless consider "damnable iteration," and his vigorously blown trumpet can hardly fail to do good by waking the slumberous authorities to a sense of their responsibilities, not only to India and to Great Britain, but to the nations of the earth.

As to the work of the sections, only a few salient points need be touched on here. The most important discussion was that on serum-theurapeutics in the Section of Pharmacology and Therapeutics. With one exception, all the speakers bore testimony to the great value of the antitoxin-treatment in diphtheria. The one hostile witness, Dr. William Gayton, was, however, an important one, by reason of his position as Medical Superintendent of the Northwestern Fever Hospital, London, where he has had an exceptionally large experience of the disease. He drew an elaborate statistical comparison between the results of treatment in diphtheria-cases in the hospital under his charge during the antitoxin and pre-antitoxin periods, respectively, and he summed up his experience and that of his colleagues as follows: "Those cases that under the old treatment would probably have died were still fatal under the new. Those which might get better recovered in about the same proportion, whilst the mild cases improved no more rapidly—indeed, rather the contrary, considering the frequency of the incidence of rashes, than those without it."

There was an animated debate on the same subject in the Section of Medicine. Here, again, there was a practically unanimous chorus of praise of the new remedy, the one dissonant note coming from Mr. Lennox Browne, who has recently found himself irresistibly impelled by his scientific conscience to publish a book banning the antitoxin, just as he was led by the same internal monitor, soon after Koch's deliverance, to issue a volume blessing tuberculin.

Another important communication was presented to the Section of Medicine by Professor E. Maragliano, of Genoa, who reported the results of a clinical trial of an "antituberculous serum" of his own manufacture. This serum he obtains from dogs, asses, and horses, "by methods different from those hitherto used, discarding absolutely cultures of living bacilli and employing exclusively the highly toxic principles extracted there-

from." This serum he has used in 82 cases of pulmonary tuberculosis of varying degrees of severity. Of these, 61 were more or less benefited, and all of them in which the disease was not too far advanced were either cured or were said to be on the high road of recovery. The serum is administered by hypodermic injection. In apyretic cases it is given in doses of 1 cubic centimeter on alternate days for ten days; then a similar quantity is given once daily for ten days; and, finally, twice daily for a like period. In markedly febrile cases a dose of 10 cubic centimeters is administered at once; then after three days, if there be no recurrence of pyrexia, a dose of from 1 to 2 cubic centimeters is given daily. If, on the other hand, the temperature rises again, a second dose of 10 cubic centimeters is administered a week after the first injection. Maragliano emphatically declared that the injections are never injurious, and he claims that they do good even in the gravest cases, neutralizing the effects of tuberculous infection. The improvement generally shows itself within a fortnight of the beginning of treatment, but sometimes it is not visible for a couple of months. Even when the disease appears to be definitely checked the injections should be continued for at least a month longer, and, by way of precaution, it will be well to inject a dose of 1 cubic centimeter weekly for at least a year after all symptoms have ceased. Maragliano's paper has made a great sensation abroad, especially in his native Italy, but the enthusiasm that it excited here was of a distinctly mild type; familiarity with "cures" for tuberculosis has bred something like contempt of them.

In the Section of Ophthalmology, Mr. T. H. Bickerton, of Liverpool, made a vigorous attack on the Board of Trade for its supineness in regard to the eyesight of seamen. A solid body of evidence was placed before the officials not long ago, pointing strongly to the necessity for greater strictness in testing the vision of the men who go down to the sea in ships, particularly in respect to color-blindness, but nothing has come of it. It is the instinct of our "Circumlocution Offices" to meet such appeals with evasion; meanwhile mysterious collisions occur, like that between the "Elbe" and the "Crathie," which are in all human probability due to defective eyesight in some lookout-man, but which the Board of Trade apparently regards as "visitations of God." The Section passed a resolution "that effect should be given by the Board of Trade to the recommendation contained in the report of the Royal Society," but it is safe to predict that till some royal or official personage is drowned nothing will be done.

The Section of Ethics was a new departure, and it is doubtful whether it has fully justified its existence. Various questions relating to the honor and dignity of the medical profession were discussed, a high moral tone was maintained, and the most edifying sentiments were expressed. It is a pity, however, that men of real authority in the profession were conspicuous by their absence from the meetings of this section, and that the business was left in the hands of a small caucus of busybodies, whose only claim to notoriety is their fussiness and their hypersensitive regard for the commercial interests of the general practitioner. They mean well, but they make the profession, of whose conscience they have constituted themselves the keepers, ridiculous in the eyes of the public.

The meeting, as a whole, was well organized, but the subdivision of the work into fifteen sections led to distinct weakness in several of them; indeed, a good deal of scientific sweetness was, owing to this cause, wasted on the desert air. The multiplicity of sections was doubtless intended as a sop to the Cerberus of specialism; it afforded a convenient means of satisfying the exactions of eminent 'ologists of one kind or another who would otherwise have played the part of Achilles sulking in his tent.

At the general meeting, perhaps, the most noteworthy incident was the reappearance of Mr. Lawson Tait, who, as far as public performances are concerned, has been, as the actors say, "resting for some time." He came forward as the champion of the general practitioner against the dreaded rivalry of the registered midwife. The discussion on this subject was conducted at a very high temperature, which reached its maximum when Dr. Murdoch Cameron, of Glasgow, significantly tapping his breeches-pocket, plainly told the opponents of the legislation for midwives that the be-all and the end-all of the agitation was the question of pounds, shillings, and pence. The antimidwife faction, however, was largely in the majority, and by their votes the British Medical Association stands committed to a selfish and discreditable policy worthy only of a body of petty tradesmen.

Another matter brought forward for discussion was a proposal to enlarge the scope of the Association so as to enable it to take an active part in the suppression of quackery and in the protection of the interests of the profession. There are practical difficulties in the way of such a development, and the ruling powers replied to the advocates of a new order of things with a simple *non possumus*. There is, however, a growing feeling among the members that the funds of the Association, instead of being hoarded up or sunk in bricks and mortar, might be more usefully applied in defending them against official tyranny, blackmailing, "sweating" by clubs and benefit-societies, and unfair and unlicensed competition, and in providing them with a pension in their old age. Whether, even if the Association managed to transform itself into such a mixture of grandmother and guardian angel, it would succeed in satisfying its members is decidedly open to doubt, but it is pretty clear that it will have to do something more for them than it does at present.

In its social aspects the meeting was a great success, though the brilliancy of the festivities was somewhat marred by the coincidence of the Geographical Congress. The annual dinner, which is the chief event of the week from the picnicking point of view, went off very well; the speech of the evening was made by Dr. W. W. Keen, who proved that he might have won fame as a humorist if he had cultivated the art instead of surgery. The absence from the dinner of men of light and leading in the political, literary, and artistic world, and the fact that no special courtesy was shown the Association either by royalty or by the city of London, gave rise to a good deal of comment. The city pleads poverty, and royal personages may not have been approached in the right manner, and, in point of fact, the Executive Committee was distinctly weak as far as social influence was concerned. Perhaps, however, the lack of external adornment is not altogether to be

deplored, as the success of the meeting shows that the medical profession can, as Pitt said literature should do, "take care of itself."

A CASE OF "HOSPITALISM."

To the Editor of THE MEDICAL NEWS,

SIR: Will you kindly give your ideas on the question that has been raised among the medical fraternity of our city as to the professional standing of the gentleman referred to in the accompanying advertisements, taken from this evening's edition of two of our daily evening newspapers? This same physician, whom we shall style "Dr. X.," is the possessor of a diploma signed by the faculty of the Medical Department of the University of Pennsylvania, and is, also, the proprietor of a drug-store, in each window of which one may read the following question addressed in large type to the casual passer-by: "ARE YOU SICK? Will prescribe and furnish you with medicine for one-half dollar." A similar advertisement appears also in the newspapers referred to. To continue the statement of his peculiar practices, he openly and freely consults with homeopaths, calling upon the members of the regular school (who may be willing to assist him) in cases of surgery, in which his extremely limited knowledge and skill compel him to turn for the aid that has thus far always been tendered him, although the very medical society to which these men owe allegiance not many years ago refused to admit their consultant into its membership on the ground of his "irregularities" in the practice of his profession! That I should be compelled to seek an expression of your views on such a question as this may seem at first blush a very needless waste of good ink, as he who runs may read this man's title clearly, and may well think me mentally deficient when seeming thus to question my own judgment, which pronounces this "Dr. X." the veriest quack who plies his wares upon the public streets! And yet, if the majority rules, we, who are in the minority on this question are sadly deceiving ourselves, and are making a most unnecessary struggle to uphold the ethics of our profession, which, we maintain, forbids us from all association with any whose methods are not those of the professional gentleman, and whose instincts are such as to degrade the professional conscience of all who may be willing to affiliate with him.

A new hospital has been recently opened in our city, and in the selection of the staff of physicians the Board of Managers determined upon "Dr. X." as one of those who should be requested to give their services gratuitously to the hospital for a term of two months. In doing this they were well aware that they would be arraying the members of the profession against each other, from a canvass previously made upon the question as to whether the members of the profession would refuse to act were "Dr. X." selected for the place; but as they found a majority who were willing to prostitute themselves to the wishes of the Board for the sake of the notoriety to be gained by an official connection with the new institution, they were willing to force the issue, even asserting their determination to break down every barrier which the Code has erected against just such practices as this, and even presumed to call in question the motives actuating us in our refusal to unite with them in accomplishing their impossible task.

At the last meeting of the ——— County Medical Society I made a special presentation of the position which has been taken in this matter by the physicians of our city, requesting the Society at that time to take official action restraining those who had openly declared their intention of so doing from serving in conjunction with "Dr. X." upon the hospital-staff. A refusal to act upon this point, I claimed, would be regarded by these physicians as a tacit admission on the part of the Society of their right to act in open defiance of the Code, and would be a direct attack upon the life of our organiztion which each member had solemnly pledged himself to maintain. *The resolution to this effect was tabled by an overwhelming vote.* What has been the result? A number of physicians whose standing in the State Medical Society is unquestioned, one of them until recently a member of its Judicial Council, are arrayed against three members of equally unquestioned integrity on a question of ethics, as to whether association with a quack is in consonance with the best and cleanest methods of medical practice. The public, unable to judge concerning the matter, sees only two conflicting parties of the medical body, and casts its vote in favor of the one that supports a public hospital, while it condemns the few whose ideas of ethical procedure in such matters are not regulated by an appeal to selfish interest, but govenred, as they think, by the plain directions of the Code of Ethics of the American Medical Association.

But the hospital has already been opened for the admission of patients. "Dr. A.," who serves first as surgeon thereto, and who said to me that he should not be obliged to have any intercourse with "Dr. X." in his official capacity, figures in this evening's paper as having performed a piece of minor surgery at the new hospital, assisted by the very man whom prior to his going on duty he intended to ignore. "Dr. B.," like "Dr. A.," a member of our County Medical Society, and who has also taken the obligation in a "solemn manner" to "loyally support the Code of Ethics of the American Medical Association," eases his conscience of the burden by saying: "I am a specialist. Why should I refuse to serve, when my duties do not bring me into any association with 'Dr. X.?'" And yet, in a case requiring the oculist's special skill, will he refuse to meet "Dr. X." in consultation when called upon by the latter from the medical ward of the hospital? Why this necessity of "having nothing to do with Dr. X." if he be a man professionally qualified for their association, which is asserted by them at one moment and disclaimed in the strongest terms the next! In their endeavors "to beat the devil about the stump" do they not see in what dilemma they must bring themselves in the end?

Let me conclude this letter by quoting a local item from an evening paper headed "Homeopathic Association Meeting. At the regular quarterly meeting of the ——— County Homeopathic Association held yesterday . . . . in attendance were ——," and "Dr. X.'s" name heads the list of members present! Now, well may these gentlemen feel a trifle discomfitted who have declared themselves in full accord with the Code of Ethics in associating with a self-declared homeopath upon the staff of the hospital. They have hitherto been loud in their declaration that "Dr. X." is a reputable practitioner, the holder of a diploma from the

University of Pennsylvania, and that we in the feeble minority ought not to refuse to meet him professionally. Will they continue this positive attitude now that the mask has been thrown aside and the man stands revealed, free from all disguise? There are two vacancies remaining, practically three, on the staff of physicians and surgeons of the new hospital, occasioned by the refusal of the obstinate minority to sell their birthright for a mess of pottage. Why not fill them by electing two homeopaths? Surely they have been able to receive one of this Association of the Hahnemannian school, an "allopath" and an advertiser besides, and the addition of several others will not *seriously* interfere with their interpretation of what the Code expects of them in their dealings with their professional brothers. The vital question is, Will the State Society say nay?

"Yours truly,

——— ———."

[We have here such a clear and typical case of "Hospitalism" that we willingly give space to this rather lengthy communication. As we wish to deal only with principles, we have omitted names, details, and signatures. The brutal advertisements cut from the evening newspapers accompanied the letter. As to advice, we would bring the matter before the State Society, with accurate statements and records of the proceedings, and demand an official and authoritative decision as to the right of membership in the State Society of the members of the County Society who voted to table and who continue to associate with an advertising quack. There is no use of compromise or shilly-shallying. The issue would better be met at once. The longer the postponement, the more heroic and desperate must the therapeutics be.—EDITOR OF THE MEDICAL NEWS.]

THE REVIVAL OF THE INDEX MEDICUS.

To the Editor of THE MEDICAL NEWS,

SIR: I enclose herewith a list of subscriptions to the *Index Medicus*, in accordance with the accompanying form which I have thus far received. This is exclusive of subscriptions sent to Mr. George S. Davis, the former publisher of the *Index Medicus*. When the physicians return from their summer vacation I hope that this list will be largely added to.

Very truly yours,
J. S. BILLINGS.

.....1895.

The undersigned hereby agrees to subscribe for one copy of the *Index Medicus* for year , at $25 per year, subject to the following conditions, viz.: When 200 subscriptions have been received by the editors the publication is to commence, and on notification of this I will send $25 to them. If, by December 1, 1895, the 200 subscriptions have not been obtained, the attempt to revive the publication will be abandoned.

Address, ...

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Address of editors:
DR. J. S. BILLINGS,
DR. ROBERT FLETCHER,
Library of the Surgeon-General's Office,
Washington, D. C.

List of Subscriptions for the Index Medicus received by Dr. J. S. Billings to August 23, 1895.

Albany, N. Y.: Dr. A. Vander Veer.

Baltimore, Md.: Dr. William Osler, Dr. H. A. Kelly, Dr. L. McLane Tiffany, Dr. I. E. Atkinson, Dr. W. S. Halsted, Dr. Henry M. Hurd.

Brooklyn, N. Y.: Medical Society, County of Kings.

Cincinnati, Ohio: Dr. P. S. Conner, Dr. F. Forcheimer, Cincinnati Hospital Library.

Denver, Col.: Colorado Medical Library Association.

Galveston, Texas: Dr. J. P. Johnson.

London, Eng.: Royal College of Surgeons, England.

New Orleans, La.: Dr. S. E. Chaillé, Dr. John B. Elliot, Dr. Edmond Souchon, Dr. Rudolph Matas.

New York City, N. Y.: Dr. G. T. Jackson, Dr. J. S. Thacher, Dr. John A. Fordyce.

Ogdensburg, N. Y.: St. Lawrence State Hospital.

Philadelphia, Pa.: Dr. J. C. Wilson, Dr. William Pepper, Dr. De Forest Willard, Dr. S. Weir Mitchell, Dr. George M. Gould, Dr. H. C. Wood.

Quincy, Ill.: Quincy Public Library.

Richmond, Va.: Dr. Hunter McGuire.

Rochester, N. Y.: Dr. John O. Roe.

Salt Lake City, Utah: Dr. S. H. Pinkerton.

Saranac Lake, N. Y.: Dr. E. L. Trudeau.

Washington, D. C.: Medical Department U. S. Army, 10 copies; Library Surgeon-General's Office, 2 copies; Medical Department U. S. Navy, 2 copies; U. S. Marine Hospital Service, 1 copy.

PRELIMINARY EXAMINATIONS IN MEDICAL COLLEGES.

To the Editor of THE MEDICAL NEWS,

SIR: There appeared in THE MEDICAL NEWS of August 10, 1895, a list of some one-hundred-and-twenty or more words, furnished by a member of the examining-board representing the Medical Society of the State of Pennsylvania. One point made in the remarks preceding this array of ignorance was that the examinations as to literary ability were too lax upon entering the medical school. The point is well taken. All the medical colleges have raised their course from three to four years; and State examining-boards have arisen to confront the young graduate, requiring that he attain an average of 75 per cent. or be refused a right to practise medicine in this Commonwealth. These, together with the incidental difficulties and expenses, stand in the way of his final step from student into professional life. This is as it should be. But what about the requirements of his becoming a student of medicine, fully matriculated in a regular school? I have before me at the present moment the annual announcement of one of the oldest and highest-standing medical colleges of the United States. The printed condition for admission is that the applicant must show a teacher's certificate or a diploma from some recognized literary or scientific school, or a *satisfactory certificate* from the master of some academy or high school. Then, in italics, the hint is given: *To save time the applicant is advised to bring his certificate with him.* If, as is common, he lacks such certificate or diploma, he finds that it is easy to get an obliging friend to write a *satisfactory certificate*, and he enters the college which is to prepare him for fame and fortune. Of course, one would

think that to be matriculated was a guarantee that one's common education was sufficient to permit graduation, but unfortunately this is not the case, and I have known more than one good, honest, hard-working student to come up for his final examination and be turned down because of poor penmanship and worse orthography. For instance, I knew a man who was to have graduated in 1894, who had an exceptional record with his quiz-masters and who made a fine average on all examinations except two, which were written, and on these he failed. One of those branches was surgery. The candidate went to the professor and asked for an oral examination, confident in his ability to answer any question on the subject that had been taught. The reply from the great professor was, "I will examine you again next year." What gross injustice! Here is a man who had expended his last dollar on his education, and was rejected in the end because of a deficiency the faculty should have ascertained in the beginning. Again, I have repeatedly had no mean scholar, while writing in the quiet of his own home and under no particular mental strain, turn to me and ask how to spell some very commonplace word. If this is so, how much greater must be the difficulty and the liability to lapses during the ordeal and mental strain of a public examination in all the important branches of medicine, and in this particular instance conducted for four days in rooms so hot and ill-ventilated that one member of the class fainted. Therefore, I think that for the bulk of the words misspelled we have abundant excuse other than ignorance, and for the remainder the student is scarcely to be held responsible. Rather place the blame where it should be—upon the heads of the trustees and professors of the medical colleges.

Respectfully, E. Z. B.

NEWS ITEMS.

A Centenarian Surgeon.—At Pesaro, on the Adriatic, Dr. Giacomo Asiari attained his hundredth year on the 29th ult., and a brief biography of him has just been issued by a local colleague, Dr. Carlo Rigoni, with the twofold object of putting on record the career of an interesting professional man, and of establishing, subject to every available check, yet another *bonâ-fide* instance of a centenarian. Dr. Asiari was born at Forli on July 29, 1795, at noon. He studied at Forli, Faenza, Ravenna, and Florence, at which latter school, on June 17, 1821, he received his diploma in medicine and surgery. In 1823 he was called to Spoleto as "chirurgo primario" in the hospital there, and distinguished himself as an able and successful operator. His next appointment was in the University of Macerata, where he filled the post of "chirurgo primario" and reader in human anatomy. This readership he succeeded in getting transformed into a regular chair of anatomy, founding, indeed, a "scuola di anatomia," which was previously non-existent in that seat of learning. In 1829 he was called to Pesaro, once more as "chirurgo primario," and there his clinical duties and the calls of an ever-increasing *clientèle* kept him actively employed for the next thirty years, during which he took rank with the leading men of the city and province, like Count Cassi, Baldassini, Paoli, Petrucci, and Perticari. He attended, among other distinguished patients, Prince Charles Bonaparte when, in company with his brother Louis (afterward Napoleon III), the Prince in alighting from his carriage had gravely injured his knee. In the cholera year of 1855 he rendered invaluable service to the poorer victims of the disease, for which the Pesarese town council awarded him the gold medal of merit. Finally, in June, 1861, he went on the retired list, and the town council, in recognition of his merits as a surgeon and as a citizen, gave him a life pension equal in amount to the salary he drew in office. Dr. Asiari thereupon made over his "armamentarium chirurgicum" to the San Salvatore Hospital, and his fine medical library to the Bibliotheca Oliveriana. Since then he has enjoyed a serene and honored old age, his one complaint being the intercurrent neuritis, to which he has been subject for seventy-eight years.—*Lancet*, No. 3755.

Meetings of Philadelphia Medical Societies:

	Meets.	Next meeting.
Academy of Surgery,	1st Monday of month, Oct.—June.	Oct. 7
College of Physicians,	1st Wednesday of month, Sept.—June.	Sept. 4
Section of Gynecology,	3d Thursday of month, Oct.—June.	Oct. 17
Section of Ophthalmology,	3d Tuesday of month, Sept.—May.	Sept. 17
Section of Orthopedic Surgery,	3d Friday of month, Oct.—April.	Oct. 28
Section of Otology,	1st Tuesday of month, Oct.—May.	Oct. 1
Section of Surgery,	2d Friday of month, Oct.—May.	Oct. 11
County Medical Society,	2d and 4th Wednesdays of month, Sept.—June.	Sept. 11
Neurological Society,	4th Monday of month, Oct.—April.	Oct. 18
Obstetrical Society,	1st Thursday of month, Sept.—June.	Sept. 5
Pathological Society,	2d and 4th Thursdays of month, Sept.—June.	Sept. 12

The New Mexico Territorial Board of Health at its meeting, June 19, 1895, adopted a resolution that examination will be required of all applicants to practice medicine in New Mexico who shall graduate after July 1, 1897, from any medical college not requiring preliminary examination of its matriculants, or equivalent evidence of satisfactory general education, and, for graduation, evidence of four years study of medicine and four terms of lectures occuring in four separate years. Meanwhile, the present standard of three years' study, three terms of lectures in three separate years, and preliminary examination of matriculants will be maintained toward all applicants who have graduated since July 1, 1890.

A Medico-legal Congress will be held at or near New York City on September 4, 5, and 6, 1895. It will be open to all students of medical jurisprudence. Quite an imposing array of papers has already been promised.

Dr. Frank Parsons Norbury has been elected to the Chair of Practice of Medicine and Clinical Medicine in the St. Louis College of Physicians and Surgeons.